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# Indigenous filmmaking practices: healing in times of climate crises

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The psychological impacts of the climate crisis and its triggers can have long-lasting consequences for public mental health. Many indigenous communities have an in-depth understanding of these impacts, and some of their filmmakers have depicted them through their audiovisual work. By challenging colonial perspectives, these indigenous filmmakers offer invaluable insights into how communities might navigate into adaptation and recovery to cope with the challenges brought about by climate change. Unfortunately, audiovisual work has often been overlooked in climate-related disaster studies despite its significant contributions. Drawing on community-based feminism and the decolonial turn, I sought to explore the healing practices employed by communities in Upper Xingu, Brazil, through the practice of indigenous filmmaker Takumã Kuikuro. To achieve this, I drew on audiovisual analysis of Takumã Kuikuro's documentaries and records (short videos) from the decolonial panorama. Additionally, I conducted semi-structured interviews with the filmmaker and three members of the People's Palace Projects, who have worked closely with Takumã, culminating in a validation meeting. I highlight three key findings for this article: (i) healing through rituals as esthetic and ethical-sacred practices within the territory, (ii) bodies in collectivism, and (iii) cascading effects on healing audiences: weaving networks from reciprocities. In seeking a discussion of the findings, I contend that there is an inextricable bond between the community-based healing responses to the climate crisis shown by Takumã's lenses and the Politics of the Bodies proposed by the Colombian philosopher Laura Quintana, allowing us to frame the decolonial understanding of healing as a political and collective action both within and with territories. Therefore, placing the indigenous cinema as a source of knowledge will enable us to bring community-based discussions that disaster risk reduction has neglected due to its embeddedness in epistemic injustice, from which at-risk communities have been predominantly seen as incapable of knowing their geographies. The rituals and collaborative practices grounded in reciprocity demonstrate forms of adaptation in which mental health becomes a collective responsibility woven into nature at its core.

## KEYWORDS

healing, audiovisual arts, climate change, mental health, indigenous populations, wellbeing, Politics of the Bodies

## 1 Introduction

Mental health and climate change research has considerably increased in the last 10 years by emphasizing the long-lasting consequences for public mental jeopardies framed by the climate crisis, particularly in indigenous peoples (Bourque and Cunsolo, 2014). However, many indigenous communities have an in-depth understanding of these impacts, and some of their filmmakers have depicted them through their audiovisual work. Unfortunately, the moving images have been overlooked in climate-related disaster studies permeated by the lasting traces

of colonialism (Cameron, 2012). In such a context, I sought to explore the healing practices employed by communities in Upper Xingu, Brazil, through the lens of indigenous filmmaker Takumã Kuikuro,<sup>1</sup> by means of semi-structured interviews and audiovisual analysis of Kuikuro's documentaries and records (short videos) from the decolonial panorama.

Before bringing forward the methodology and results of this qualitative research in detail, I will provide a general picture of the Upper Xingu community to introduce the representative role of this filmmaker. Then, I will place an overarching framework of decolonial turn in audiovisual arts and mental health studies that enable us to see some traditional cultural practices beyond the surface as community-based responses of healing embraced by a non-western system of knowledge in response to the effects of climate change.

## 2 Context

### 2.1 The upper Xingu, Brazil

Sixteen indigenous people live in the Upper Xingu, according to one of the Takumã's records (2020). Franchetto and Montagnani (2012) describe the Upper Xingu as located in the Amazonian rainforest in the central Brazilian plateau (Franchetto and Montagnani, 2012), which was the Carib's homeland (Derbyshire, 1999)—the language spoken by Takumã's tribe and three more communities from the Upper Xingu. The 11,500-square-mile Xingu, north of Mato Grosso state, became the first national park guarded by indigenous peoples in 1961. This achievement was not easy to obtain. The Villas Bôas' brothers started their first expedition to explore the center of Brazil in 1940 (Villas-Bôas and Villas-Bôas, 1979). The film *Xingu* (2011) epitomizes the first contact between the Xingu people and these brothers by making explicit the fear of not being able to understand the language of each other. However, this initial encounter was not an obstacle to getting to know and thereby nourishing a genuine collaboration with the indigenous communities to the point where the idea of a national reserve became a reality.

A systemic genocide attuned with the traces left by, in the Villas-Bôas brothers' words, "haunting centers of civilization" shaped a profound inequality and exclusion for indigenous peoples in Brazil. The over-demanding of land-using, owing to the boom of sugarcane, timber, gold, latex, Brazil nuts, and rubbers, increasing disproportionately until today in Brazil, framed massive expansions of crops and positioned the resource extraction as the dominant economic model. The Brazilian government began to invade the indigenous territories on behalf of the development that eventually would shape an "ironical measure whereby blind power safeguarded the invader against his victim!" (Villas-Bôas and Villas-Bôas, 1979, p. 14).

By upholding this state of affairs, the Villas Bôas' brothers and indigenous people found the declaration of a national nature park to be one of the most substantial actions to grapple with this genocide. Yet, what the Villas-Bôas brothers never thought was that after so

many struggles undertaken, a government like Bolsonaro's would allow the deforestation of about 89,000 foci, inclusively that 38% of these lands belonged to indigenous territories (Rapozo, 2021). This political violence became a state of affairs that denied any expression of popular sovereignty by fostering unsustainable agrarian activities, mining, and crimes committed against environmental activists (Global Witness, 2019). This atmosphere acts upon a colonial system that enforces inequality conditions for indigenous communities. Concretely, for the Upper Xingu community, Takumã's films epitomize not only these consequences at psychological and social levels but also some ways in which the indigenous people have coped with these impacts.

### 2.2 Introducing Takumã Kuikuro

Takumã started his practice as a filmmaker at Video nas Aldeias (VNA) in 2002. This renowned project in Brazil, led by Vincent Carelli, set the goal of training indigenous peoples in audiovisual communication in remote villages using workshops, aiming at exchanges of knowledge between villages and visibility about the day-to-day indigenous people's life to the main cities (Queiroz, 2013). Accordingly, Gleghorn (2017) lays down that "among the titles attributed to Video nas Aldeias, many harness the archival vestiges of ethnographic and colonialist filmmaking to prompt discussions at community level regarding ancestors, the past, and the legacy of filmmaking" (p. 176). During a conference, Carelli (2018) highlighted that each village collectively chose those who would be involved in the audiovisual workshops. I could say that many of those involved in these workshops placed the filmmaking practice as the foundation to undertake several collective ideas (Gleghorn, 2017). This is the case of Takumã Kuikuro, albeit he does not define himself as a filmmaker. During an interview held by Jesus (2021), Takumã remarked, "I wonder if I really am a filmmaker, or a researcher, or just a person from the village" (p. 93). After naming the motivations that enable him to frame filmmaking as a practice in which everyone in the village is involved, he concludes, "I'm an Indigenous researcher, an activist for my culture, an environmental activist and a documentary filmmaker" (p. 93). He became the president of the community-based organization Upper Xingu Family Institute [Instituto da Família do Alto Xingu], which seeks to strengthen local, national, and international partnerships. Moreover, together with other filmmakers from the village, Takumã established the Kuikuro's Collective Cinema, aiming at keeping the training in audiovisual arts and the use of digital technology. Amidst this purpose, the collaborative work between People's Palace Projects (PPP) and Takumã begins. In 2014, PPP visited the Upper Xingu and the Kuikuro—Takumã's community—for the first time. Since then, PPP has worked regularly in the Xingu Indigenous territories—particularly with the Kuikuro people in Mato Grosso State, Brazil—conducting research projects that highlight how the communities nourish wellbeing materially, artistically, and emotionally. Particularly, in the last 5 years, this partnership has focused on audiovisual production that outlines the consequences driven by the climate crisis and the COVID-19 pandemic in the Amazon, having as a background the Bolsonaro's government whose policy is grounded by extractivist and capitalist models as I will point out in the next section. In essence, the selection of analyzing Takumã's filmmaking practice is based on the roles he meets in his community,

<sup>1</sup> Most of Takumã's quotes are originally in Portuguese. The author translates into English the corresponding notes.

such as a leader, filmmaker, and researcher, and also the work undertaken with other institutions such as PPP. These actions indicate how Takumã anchors his collaborative and participatory practice with ongoing organizational, economic, cultural, and political dynamics from the Upper Xingu. Consequently, the pivotal focus for his films has been the depiction of communities' wellbeing, from which healing practices are embraced by different topics inspired by tackling death and losses in the community's daily life.

## 2.3 Decolonizing audiovisual arts: indigenous filmmaking in Latin America

The colonial legacies have left entrenched traces in art worlds, social sciences, and humanities. For decades, the colonial outlook reinforced the notion that the indigenous communities could not meet the expected esthetics standardized by the *fine arts* and much less by the audiovisual studies. Labels such as *Primitivism* or the *Outsider Arts* come from this framework (Burns, 2021).

Indigenous filmmakers have framed anti-colonial and antiracist narratives into their cinema in response to Western and whiteness labels still prominently used, such as indigenous filmmaking “articulate(s) pointed critiques of grievances committed against communities, to enact resistance and foster cultural transfer across generations” (Gleghorn, 2017, p. 168). Accordingly, this cinema becomes a relieving art from the colonial paradigm (Hernández, 2012), whose core is the moving image as part of the decolonial turn. Mora (2012) posits that indigenous filmmakers may devise a radical conception of the body, an esthetic experience, and an ideal of society through camera lenses. That is to say, rather than representing a specific reality, indigenous cinema performs challenges around theoretical frameworks whereby political and social agency is the core. This socio-political enactment does not necessarily need to be clearly shown in the scripts or the moving images; it may pierce decisions around the edition, characters, prompts, scenes, and sounds. Indeed, collaborative practices between community members seem to be the umbrella by which many audiovisual projects are devised. Both collaborative practices and socio-political enactment are results of or at least have been engaged by a particular background. Gleghorn (2017) recalls, as milestones, the “Report on Self-Determination under the UN Declaration on the Rights of Indigenous Peoples” as well as the creation of some civil society organizations that have significantly influenced the recognition of cinema in Latin America, such as CLACPI [The Latin American Coordinator of Cinema and Communication of Indigenous Peoples], Mexico, 1985; CEFREC [Foundation for the Development of Intercultural Communication], Bolivia, 1989; and Video nas Aldeias [Films in the Villages], Brazil, 1987. The latter was the beginning of the career path for Takumã, who became a leader, researcher, and agent to enhance collaborations with external organizations, as I have shown above, due to his filmmaking practice. Recently, his audiovisual research and activism has explicitly focused on climate change and facing COVID-19 by bringing out community-based forms to improve wellbeing as one of his significant enactments.

Accordingly, Takumã might act upon many indigenous communities that have an in-depth understanding of the impacts brought about by climate change and, even more, have reinforced responses to coping with the distress driven by the environmental

degradation in their territories (Ellis and Allbrecht, 2017; Cunsolo and Ellis, 2018). One of these responses is to heal the grievance shaped by the day-to-day deforestation, drought, wildfires, and other emergencies that have been fostered by political settings grounded on ethnocide and ecocide, which are inextricably related to capitalism and colonialism (Crook et al., 2018).

Audiovisual work led by indigenous filmmakers may depict not only these responses but also non-western epistemologies and ontologies that need to be revealed to challenge current legitimized clinical research on the indigenous population as well as the prominent westernized definition of mental health, in which body and mind are separated entities.

By challenging colonial perspectives, indigenous filmmakers offer invaluable insights into how communities might navigate into adaptation and recovery to cope with the challenges brought about by climate change. The research around the climate crisis needs to open the doors to listening creatively to people from different forms of non-written communication, such as the moving images portrayed by the audiovisual arts. Accordingly, this study and its involved research process seek to place the decolonial gaze as a journey to understand better the key role of healing and wellbeing in the current climate crisis.

## 2.4 Decolonizing mental health studies: healing practices

Colonization shapes particular concepts of humanity and humanization in society that we end up embedding and reproducing wittingly and unwittingly through research, day-to-day life, and how we perceive ourselves. Rivera (2012) would call it internalized colonialism. This internalization comes from a wound that evokes an embodied injury that fashions behaviors, feelings, thoughts, and even forms to connect with others (Maldonado-Torres, 2008; Maldonado-Torres et al., 2021). Consequently, Fanon (2021) reminds us that we cannot disrupt the colonial reality without identifying the colonial wounds embedded in ourselves. Hence, in Robcis's words (Robcis, 2020), “colonialism had a direct psychic effect” (p. 302).

In other words, there is no room for imagining other lives in a colonial venue, even other versions of the past, as though the present was fixed and organized for a whiteness purpose (Segato, 2018). To enhance movements during this paralyzed time, Fanon (2021) draws attention to the need for *disorders* as a first stage once decolonization takes place. Meaning, upheaving moments emerge to bring to the main scenario countless ontological and epistemic shouts to challenge the global truths on what we mean about science, knowledge, society, and even about ourselves. Through the decolonial turn arises voices, bodies, geographies, knowledges, and enactments from people directly affected by colonization's havoc, such as indigenous and black people in the context of South America.

Unfortunately, colonialism continues to wreak havoc on how we research and understand public health, diseases, crisis, and wellbeing. Pathologization and individualistic analysis are its core (Kumar et al., 2021; Sharpe and Davison, 2021). For instance, Albrecht (2011) brought together eco-anxiety, ecoparalysis, solastalgia, and econostalgia as part of psychoterratic syndrome conditions by placing the bio-psycho-social responses to the negative changes brought about by the unknown dynamics of the Earth. Therefore, some diseases and distress can appear once the environment changes the day-to-day

relationship with the territory (Albrecht et al., 2007). In what follows, Cunsolo and Ellis (2018) posited the topic of ecological grief that allows an understanding of attachments, ties, and psychological affections regarding environmental losses and mental health.

Particularly, Pihkala (2021) proposed the label eco-anxiety to recognize the direct symptoms triggered by climate change; however, she stated the psychosocial dimensions as necessary contributors to mental health protection. Sultana (2021) puts on the table that intersectionality is a framework to understand differentiated marginalization in climate change's effects based on different layers such as gender, class, age, race, religious beliefs, and conditions of migration.

Accordingly, the same pathologized and colonial models overlap the most prominent answers to the question ¿what do climate-related changes cause psychosocial impacts in indigenous peoples? Middleton et al. (2020) listed psychiatric disorders in indigenous communities owing to climate change, such as depression, stress/trauma-related disorders, substance abuse, and suicidal thoughts. These colonial views might also be depicted as overgeneralizations, such as some stated by Vecchio et al. (2022), who placed the ontology of being indigenous as the “the most vulnerable” to cope with the climate crisis. Other studies highlighted environmental factors as the cornerstone of psychological wellbeing in native populations under the same model. For instance, Durkalec et al. (2015) pointed out ways in which physical qualities of a place might be the core for physical, emotional, and spiritual health in populations such as Inuit (e.g., sea ice is symbolically defined as freedom). Consequently, the likely changes fostered by global warming could have profound impacts on their cultural life and thereby on their wellbeing.

Nevertheless, Jones et al. (2022) established the incoherence of studying the environmental crises from the same Western epistemology that has legitimized violence against nature. This same theoretical lens has placed the impacts of climate change on indigenous communities in the academy as if they were passive subjects waiting for the “illustrated whiteness” to be understood and rescued. Attention focused on psychopathological models and individualistic approaches within mental health studies could be a clear example (Fernando, 2010).

In this way, decolonialism strives to devise psychological, social, cultural, political, and economic strategies, whereby the racialized and marginalized practices are unveiled to resignify dignity, collective memory, and identity (Rivera, 2012). In this vein, healing is a starting point for finding some of these devices as long as colonial wounds are always there in our behaviors, feelings, thoughts, and forms to connect with others (Maldonado-Torres, 2008).

The intersubjective space framed by wellbeing purposes enhances the capacity to be aware of the surroundings, which might become a significant action for healing (Hooks, 2019). Thus, awareness and healing are not cognitive occurrences (Akomolafe, 2022). Instead, Akomolafe stated that healing ourselves is a conundrum that implies slowing down; in other words, “to move along with the world (...) bringing the others into the room (...) situating ourselves on a moving planet, in a fluid processual relational world that is not amenable to our theorizations” (2:30). Therefore, healing is reciprocity and synchronicity among the surroundings, cosmos, and inner life. Similarly, Hooks (2019) said that “we connect our well-being to the well-being of the earth” (p. 40). Consequently, healing might evoke synchronicities between actions—what others have done; time—the need to slow

down to self-awareness; and space—those becomings from the environment that potentially shape forces for wellbeing. Rather than an inward-looking psychological matter, healing combines an assemblage of psychosocial and environmental aspects that act upon resources and capacities to overcome a spectrum of traumas, many pierced by colonial and patriarchal legacies.

Therefore, this research pursues to disturb these colonial research methods—commonly used in medicine, psychiatry, and clinical psychology, to explore how indigenous peoples tackle climate-related changes in their territories from their politics of wellbeing, which are ontologically distant from the approach of seeing themselves as passive subjects in help. As I mentioned previously, this westernized view remains in an unquestioning arena that might blind pathways of dialogs of *knowledges* as well as collaborative practices grounded in non-western scholarship.

### 3 Methodology

This collaborative research followed the principles of the decolonial and feminist practice *Sociology of the Image* (Rivera, 2005), through which the moving images become a means of recognizing legitimized colonial representations but also a way to decolonize ideas by bringing back different *knowledges* that are not grounded in westernized written forms banished by colonialism, patriarchy, and capitalism. I undertook a video-based qualitative analysis (Borish et al., 2021) of the moving image framed by Takumã Kuilkuro, in dialog with a narrative analysis from four semi-structured interviews with Takumã and three members of the organization People's Palace Project who work closely with him.

Borish et al. (2021) outlined some advantages of the video-based analysis since it is possible to set a final audiovisual output shaped by the analysis itself—thanks to the use of software—in addition to enhancement “(...) the ability to explore people's tone, facial expressions, hand gestures and other features of the audiovisual data that also supported a unique and high impact approach to storytelling, knowledge mobilization, and community engagement” (p. 4). Therefore, this analysis of the bodies' movements becomes an analysis of narratives in which not only the *speakable* content matters but also embraces an inductive method by emphasizing images and films as an assemblage of voices that have been epistemic and ontologically silent.

On the other hand, by doing a narrative analysis of these interviews, I tuned into localities to gain more understanding about the depiction of healing practices through the Takumã's lenses, avoiding universalization, which has been one of the most colonial pretensions in science (Fernando, 2010). In what follows, there are six methodological moments through the research process, as Table 1 indicates.

### 4 Results

Before bringing forward the results, I will place the definition that Takumã provides about wellbeing as this is the foundation to situate the reader into non-western conceptions to avoid potential misinterpretations of the quoted narratives. As I initially indicated, this research veers away from individualistic and pathological approaches that sustain epistemic exclusion about what knowledge

TABLE 1 Methodological moments.

Moments	Critical steps
I. Validation and writing the proposal	<ul style="list-style-type: none"> <li>- The validation moment allowed me to corroborate that the four people, who voluntarily participated in the study, deliberately discussed the scope, methods, and outputs of the research. To do this, I arranged a meeting with People Palace's Project (PPP) and Takumã. Overall, Takumã proposed the interviews with himself and the professionals from PPP who had previously worked with him and were strongly familiar with the Upper Xingu context. Having these criteria in mind, PPP chose the final three participants. He also asked to highlight that <i>we did not pretend to talk on behalf of the Upper Xingu's communities</i> through this research</li> <li>- The proposal was written according to the feedback provided by the participants. The Research Ethics Committee at Queen Mary, University of London, accepted the application as all the requirements to guarantee ethical behavior were fulfilled</li> </ul>
II. Literature review	I focused the scope of the review on understanding the Kuikuro and Brazilian context as well as the recent publications in English and Spanish about healing and mental health as the main topics concerning the climate crisis
III. Selection of films and semi-structured interviews	<p><i>Selection of Films:</i></p> <p>Takumã highlights that there are “documentaries, with a constructed narratives, to be shown in universities, film clubs, festivals, etc. (and) records (...) that document community actions and activities, such as rituals, for example, and circulate only in the villages’ (Jesus, 2021, p. 94). Keeping this in mind, I separated the Takumã’s outputs into these two audiovisual forms. Concerning the films, I analyzed nine (9) Takumã’s records found on the YouTube platform and thereby in the public domain, as well as three (3) documentaries. This latter selection was based on the interviews through which some films were spotlighted in regard to epitomizing the idea of wellbeing and healing (see Table 2)</p> <p><i>Semi-structured Interviews:</i></p> <ul style="list-style-type: none"> <li>- Taking into account the collaborative approach and the purposive sampling, which means that the researcher and the project’s collaborators decide those who are most compatible with the aim of the investigation, the filmmaker Takumã Kuikuro and three professionals within People Palace’s Project, who worked closely with communities in the Upper Xingu, became key participants. I sought an in-depth understanding of the process of filmmaking in the territory</li> <li>- I conducted four semi-structured Interviews following Adeoye-Olatunde and Olenik’s statements (Adeoye-Olatunde and Olenik, 2021). These interviews consisted of longer and more discursive questions, which allowed the participant to further discuss Takumã’s films in regard to healing topics. The interviews lasted approximately 1 h and a half each, and PPP hired a simultaneous translator for the interview with Takumã (Portuguese-English) as well as for the validation meeting. These interviews were audiovisually recorded by asking Takumã and PPP’s professionals beforehand about the agreement with the Consent Form. I emphasized that the information could be identifiable, but there was the possibility to delete any sensitive information</li> </ul>
IV. Narrative and audiovisual analysis	The analysis was conducted using audiovisual sources to identify verbal and non-verbal forms of communication related to healing and wellbeing portrayed in explicit narratives—the spoken words—and non-verbal communication such as rhythms, movements, rituals, and ceremonies. The qualitative data analysis was undertaken by the software NVivo 12, to put together the image with the narrative content using video-based analysis. This enhances ‘deep understandings from human experiences, knowledge, stories and their embedded visual contexts’ (Borish et al., 2021, p. 4). In seeking the dialog between form and content, I transcribed extracts from the films and interviews in accordance with the codes provided by NVivo
V. Validation and findings	I had one meeting with Takumã and People’s Palace Projects (PPP) to validate the key findings. The validation meetings are a further opportunity to correct any misunderstanding or misrepresentation of the participant’s ideas as provided in the interviews and/or produced through the process of analysis. In this context, the validation meetings help to jointly identify unexpected risks after the data collection as well as to manage them based on Takumã and PPP’s experience. The participants agreed with and elaborated on the final results
VI. The audiovisual output and final report	The audiovisual fragments from Takumã’s films and the recordings of the interviews were the basis for creating the final dissertation report and an audiovisual output to communicate key findings. I anonymized or deleted data that participants asked me to remove from the identifiable audio-video material. I sent a preliminary audiovisual output to the participants in order to validate the highlighted information. This output also helps to disseminate the final results to other indirect stakeholders related to PPP and Takumã’s work

should be validated. In what follows, Takumã points out that an assemblage of healing forces would be one of the main features of wellbeing. In this vein, he defines wellbeing as a “force of nature, a

force of spirituality (...) wellbeing is the peoples’ health (...) to practice our culture (...) And you transform to see how to connect with nature, like painting, music, traditional food. These forces seem

to be in nature but also in the groups, in the collectivity, (...) it is what people bring and influence others' (Personal communication, 13 July 2022). Overall, this definition is grounded in a sharing responsibility as the force of wellbeing must be found in cultural actions cross-linked with nature.

I highlight three key findings for this article: (i) *healing through rituals as esthetic and ethical-sacred practices within the territory*; (ii) *bodies in collectivism*, and (iii) *cascading effects on healing audiences: weaving networks from reciprocities*.

## 4.1 Healing through rituals as esthetic and ethical-sacred practices with the territory

According to Takumã, rituals bring joy, bringing the force of wellbeing. The rituals "connect people with nature" (personal communication, 13 July 2022), the same as bodies respond to the rhythm of nature. This idea might be illustrated by the *Kuarup ritual* (2020), prominently highlighted by all participants when we discussed the main forms of healing. This is one of the most essential and wide-range rituals in the Upper Xingu as it brings different communities (Aldeias) together in an array of collective actions (e.g., cooking traditional food, arranging traditional games, and painting some sacred trees and themselves). Some moments of this ritual are recorded in the 1-min Takumã's video called *Kuarup* (Kuikuro, 2020b). This ritual is also one of the most important healing rituals for the Upper Xingu communities as it is "the last weeping that people do" (Personal communication, 13 July 2022). People of any age and gender can be involved in this ritual. The Kuarup aims to address the mourning process in families who experienced the death of a relative or a loved one (to) "start to overcome grief; a matter of recovery. It is a thing that helps to take away sadness (...) it is a thing to purge your body (...) to wipe tears away, the bad things you have (...) it happens at the end of mourning, end of mourning for us."

According to Takumã's words, healing is deemed as recovery [*recuperação*]. Yet, Kuarup shows us that collective responsibility is one of the main features of this recovery. Coping with death, weeping tears, and welcoming joy are actions that embrace others to attract more forces of healing. Those *others*, namely members of the communities, animals, forest, and spirits, potentially strengthen the ritual to meet its target. Accordingly, one of the PPP's professionals outlines that "Kuarup is the insistence that rhythm of life and death, it is not individual one, it is community one (...) is when a society, a community, acts out that passage in a way that is more collective" (Personal Communication, 4 July 2022). Therefore, there is a responsibility with other bodies, in joy and pain, physically and emotionally, that is also communicated by means of the skin.

Bodies, in response to rituals, become an esthetic vehicle for communication. Takumã outlines that the communities "have to paint themselves," especially in a reddish color. The painting is called Uruku (red pigment) and seeks to lure forces related to wellbeing. After 3 days of grieving in the Kuarup, it is not coincidental that "(...) they would do a ritual during which everyone comes together in the center of the village, remove all their clothes and any decoration they have and wash themselves (...) It is a collective effort to washing off the pain and washing off the grieve and carry on with life (...) and then painting themselves in red" (Personal Communication, 24 June 2022).

In talking of the Kuarup purpose, another PPP's member, who was a witness of this ritual, talks about "the rhythmic percussive used in their bodies (...) they are literally all those bits from the ground (...) that echoes through the village and echoes through the body" (Personal communication, 4 July 2022). During the interview, the participant also stresses that by painting themselves, "they will be able to find spirits (...) strengthen their links with the nature."

Consequently, the rituals enhance ties with the territory—a territory felt and thought in its geographical and sacred layers. The meaning related to the adjective *sacred* is associated with "a thing very important within the community\*" according to Takumã's words (personal communication, 13 July 2002). Human and non-human beings are involved as there are spirits in animals, objects, trees, and different elements in nature that, sometimes, are not perceptible without traditional medicine; "ritual includes lots of external features (...) the ritual for them is about the relationship to those objects, they invest the power in the object" (Personal communication, 4 July 2022).

To find or attract those spirits that bring healing forces, painting bodies is only one part of the universe of activities and tasks to be done; fighting games such as the *Huxa-huxa* and shouts (*gritos*) are essential to complement the calling for healing. Regarding the latter, Takumã states that these shouts are "(...) for joy, shouts for waking things up, shouts for touching sacred things (*grito de tocar sagrados*)" (personal communication, 13 July 2022).

Whereas Takumã highlights the shots focused on the dances that drew his attention from India in the documentary *London as a Village*, he explains that the dances in his community are not for gods; instead, "it represents the animal's voices. Our ritual dances are: the Parrot Dance, the Armadillo Dance, the Fish Dance, the Vulture dance. We dance the dances of many animals" (Kuikuro, 2017, 15:30).

Thus, rituals bring together collectivism, esthetics, and ethical responses as the behaviors and actions must resonate with what the community and territory need to heal. These practices are also differentiated by gender. Women and men have precise roles and actions for different rituals. For example, the documentary *Hyperwomen* (2012) showcases a scenario when a woman, who knows the chants for the rituals, gets sick. This situation turns into one of the main questions to be answered through the film: who will be the person that will undertake this remarkable labor? Some members of the community, mostly men, start asking other women about potential solutions and resorting to the Pajé to treat the woman.

This issue, which becomes an important drama for the documentary, shows us that women and men meet precise roles in the territory and thereby in rituals. In this sense, Takumã calls attention to the risks that might bring the western-based discourse about equality: both women and men need to do the same activities.

Indeed, the rituals are psychosocial expressions from which members of the communities conduct actions for healing themselves, the community, and the territory at the same time. By acknowledging that rituals are ways of emotional labor from grief and mourning, they are also driven by the purpose of preventing potential crises and disasters since rituals enhance the sacred protection of the land and direct communication with sacred being to find solutions, including the climate crisis.

Nevertheless, owing to emergencies such as COVID-19, "The Kuarup was canceled for public health reasons (...) they took much more care than we are able to take even putting themselves through a

spiritual risk by canceling the Kuarup” (Personal communication, 4 July 2022).

Canceling the Kuarup was a way to reduce the risk associated with physical impacts from COVID-19, but it increased psychosocial risks that might work as a cascade of negative effects to deal with the cluster of threats and emergencies brought about by the climate crisis. Therefore, it is likely that the rituals are particularly thought for reducing risks and gaining knowledge rather than responding to emergencies that do not come from indigenous territories.

## 4.2 Bodies in collectivism

The documentaries, records, and interviews focused on the idea of collectivism in which not only human beings participate. The land, the body, and the community resonate to be part of the healing process, “as an one-piece, as people as land (...), if you heal your territory around you, you are healing yourself as well” (Personal communication, 24 June 2022). There is “a much more intense understanding of the physical” (Personal Communication, 4 July 2022) in regard to healing responses. Yet, this understanding of the physical body is not based on individual aspects. The bodies are connected and thereby require actions to find a balance with each other. One of the PPP’s members shares an experience with Takumã that allows us to illustrate the responsibilities brought about by the interconnectivity between bodies beyond a geographical demarcation: “(...) so the fact that his (Takumã’s) son gets some ill at the distance when he (Takumã) is eating meat is something that he feels, (...) they may not be connected in our cosmology or our science, but they are clearly connected for him (...)” (Personal Communication, 4 July 2022). Indeed, Takumã “stopped eating meat” with the purpose of looking after his son. This decision suggests that ethical/unethical behaviors emerge to look after the other as a human being, as a territory, and as an animal. Subsequently, from the body, as same as from the community, emerges collectivism.

Collectivism as a set of healing responses is also depicted through activism; “you can see that actually activism is a way of collective healing for them because by being given the platform of making a way themselves to actually speak up is making a huge difference on all the power structures within communities (...)” (Personal communication-2, 24 June 2022). The indigenous communities speak up against injustice through activism and raise their voices to shed light on their knowledge. Both influence socio-political spheres and hence emotional processes that are directly linked to the land and all those elements provided by it. This premise can be illustrated by the record *O Sal Do Xingu*, which indicates “salt means for us cosmology, a link with the sacred because it is flavor and argument” (Kuikuro, 2021, 23 April 2021, 1:22).

Consequently, it seems that collectivism is embedded in day-to-day life and hence the way of seeing the world. One of the PPP’s members outlines the organically natural way Takumã decided what would bring about London in *London as a Village*. He prioritized the scenes and lifestyles that would evoke collective processes, such as the representation of dances of India and how people live in houseboats and get to know each other. Indeed, Takumã found easy connections regarding how people have another relationship with nature. Another illustration brought forward by one participant is the way “(...) they are related between each other (...) they have the same

surname (...) everyone has the surname Kuikuro basically on the village” (Personal communication-2, 24 June 2022). She also points out the fact that they call each other as relatives, which might be seen as a term of endearment to explicitly indicate that they belong to the same territory.

In essence, this result may turn into a philosophical basis intertwined with the collectivism that beams light on forms of healing regardless of what type of potential trigger may emerge or in which context occurs.

## 4.3 Cascading effects on healing audiences: weaving networks from reciprocities

The filmmaking pathway became a door for relieving through emotions, thoughts, knowledge, and ongoing events, which can be communicated to different types of audiences. Simultaneously, members of the communities in Upper Xingu participate in documentaries and records by seeking to unveil what they have built up on their own as a community.

After the audiovisual analysis, there are prominently three target audiences: the community (the group who live in a particular geography, which in this case would be the Kuikuro community), the indigenous peoples from other villages, and the non-indigenous people.

The decisions around editing are made as long as the scope of the audience is defined collectively. For instance, there are many chants and expressions that are not translated into Portuguese in the documentaries. The fact that these scenes only are understood by people who speak Carib or who are familiar with the oral traditions shapes a private moment for the first audience: the community. According to Takumã, this no-translation is done as a reminder for the community about the communication and teaching of ancient knowledge, whose core might be seen at risk owing to changes brought about by threats such as evangelization, uncontrolled use of technology, or the use of money as the main resource.

Takumã’s practice might epitomize the scene for proposals to set ideas for strengthening the community by recognizing the injuries left by the state of affairs particularly provoked by Bolsonaro’s government. The filmmaking process led by Takumã might be seen as an autoethnography from which the Upper Xingu can “amplify their voices (...) promote all the social action, activities, activism they have been doing and are so important to share with the world (...) Takumã thinks about that (...) how video making is a powerful tool to capture their stories with their own hands basically, because Takumã captures from the inside what it is happening” (Personal communication-2, 24 June 2022).

Additionally, Takumã decides to only take into account objects that are in his territory for his films as well as to emphasize shapes and frames typical of his community, such as the architecture of the Kuikuro’s houses. Through one of his records, Takumã highlights with the camera that these houses are made with native trees found in the forest; accordingly, “every tree has a spirit, every house has a spirit” (Kuikuro, 2020a, 1:14).

Under the same idea of *the sacred*, the camera shots chosen by Takumã are attuned to the way in which he perceives his territory, his community, and the political commitment around his practice. Similarly, the principle about *the sacred* is assimilated into sounds and

soundtracks. The sounds of the forest, the day-to-day sounds of the village, as well as from traditional instruments are the only ones used by Takumã. Therefore, we could talk about *sounds in-site*, those that are organically part of the scenes, and those edited by Takumã to put in specific moments. The latter is frequently used at the beginning and the ends of the records or in all the videos with the pretension of rendering visible events or specific traditions, namely the record *Jogos Mundiaies Indigenas*.

These decisions might indicate the ethical relationship between Takumã and the territory navigating into forms of outlining the knowledge led by his community; “(...) how important it is for him (Takumã) always come back to the village” (Personal communication-2, 24 June 2022).

Overall, Takumã’s filmmaking practice by itself creates a basis, a foundation that works as beams of light to guide singular and collective responses for different triggers linked to climate change, but also to set ideas based on knowledge exchanges. On the one hand, these exchanges aim to share part of their knowledge from the Upper Xingu communities to other contexts, especially westernized settings at national and international levels, particularly in topics related to environmental protection and arts, and on the other hand, new partnerships can enhance community-based plans to become a reality, for instance, more audiovisual tools to continue their training in filmmaking.

These exchanges have been mediated by “resource-based understandings” (Personal communication-3, 4 July 2022). The interviewees noted that a reliable partnership is essential to get activism that influences the responses to the climate crisis. This confidence has been nourished thanks to the project *Artistic Residency* set between the Kuikuro people, coordinated by Takumã, and PPP in search of artists from the Upper Xingu to get to know London and artists from the UK and Brazil who would visit the Ipatse Village in the Xingu.

After Takumã’s trip to London in 2015, where Takumã filmed *London as a Village*, PPP and Takumã started artistic residencies in the Ipatse village. London-based artists have traveled to the Xingu area to generate art-based outputs and ideas, as indicated in the following statement: “We, the Kuikuro, started bringing white people to the village in 2017” (Kuikuro, 2017, 2:29).

Among the different exchanges during the first residency in the village, one of the PPP’s members emphasizes the context of each residency as same as some records in which Takumã participates (personal communication-1, 24 June 2022). For instance, the second exchange was the participation of the Kuikuro in one of the most important arts festivals in Rio de Janeiro *Multiplicidade* (from 26 August to 15 September). Similarly, the song *Hekite Gele Ege* (In English, which means How are you?), which contains words in English, Carib, and Portuguese (People’s Palace Projects, 2017), was composed with non-indigenous artists who visited the village this time.

Knowledge exchanges serve as a “learning experience for everybody, for us, for them, for me, for everybody. We all are learning together and the idea is that everybody gets new places (...) everybody should become richer with this knowledge” (Personal Communication, 16 August 2022). This positionality sheds light on the need for willingness to show what *we have learned and what we have dreamed of*, particularly, between PPP and Takumã, who puts to the community any potential agreement.

Additionally, using arts as the main resource solidifies equitable power relationships between indigenous and non-indigenous peoples. Accordingly, from the PPP’s side, there is an imperative synthesized in the question, “how we gain in that exchange in an equal and mutual way?” (Personal communication-3, July 4 2022). Accordingly, the residences with PPP have laid some foundations for the current responses to the climate crisis. Moreover, this coping mechanism acts as community-based resistance to avoid repeating previous genocides in indigenous peoples fostered by diseases that come from non-indigenous people, as some Takumã’s records point out.

Consequently, healing involves collective memory, which is important to be addressed under reciprocities and participatory approaches. Healing opens up collaborative paths from which new technologies may contribute to putting *resistance* in place, for instance, by communicating what is happening in the Amazon and the “political actions that are destroying our people” (personal communication-5, August 2022).

However, Takumã makes us aware of the risks that may bring these exchanges if the community does not bring enough force to keep healthy, in other words, to keep alive the rituals and all the components that attract wellbeing; thereby persisting that “my religion is the forest, the water, the resource, painting, traditional singing” (personal communication-5, August 2022).

## 5 Discussion

I sought to identify healing forms of the Upper Xingu communities in response to the effects of climate change by means of Takumã’s filmmaking practice. According to these three results, healing is neither an individual matter nor a natural process that takes place on its own. The forces of healing emerge from particular actions in human beings and geographical conditions. In this sense, wellbeing embraces biocultural dimensions that could be epitomized in collective practices as part of holistic wellbeing attuned to the ecosystem (Rivera, 2020). The rituals might act as a builder and preserver of ancient knowledge that enables nourishing wellbeing, portraying the sacred pierced in the land, represented on the skin, and performed through dances and sounds. Neurath (2021) posits that the rituals are part of a modern artistic practice, which encompass forms of symbolization (dances, performances, music, painting, and so forth) framed by the appreciation of difference and diversity, since it makes a way to communicate with other beings in the shape of animals, objects, plants, or any other event that come from nature.

Thus, the healed bodies enhance the protection of the land and the sociopolitical organization in place. In this respect, the community-based healing responses to the climate crisis shown by Takumã’s lenses are related to the emancipation of bodies; they are called *collectivism*. The second key finding indicated it. Emancipation is only encouraged by giving visibility to the territory where he comes from, with its people and surroundings. Takumã’s political commitment translated into his shots and edition also creates an entitlement to the bodies that come from an unknown place for many mestizo Brazilians. As a matter of fact, Takumã portrays the *non-being* space at length, the life of anonymous bodies silenced and overshadowed in the imperialist-colonial-patriarchy mindset (Quintana, 2020).

As a result, filmmaking becomes a healing practice by itself. Similarly, Takumã recognizes that his practice has been supported by



TABLE 2 List of records and films included in the video-based analysis.

N°	Name in Carib and Portuguese	Title in English	Directors	Length	Year	Type of film
1	ETE London Londres como uma aldeia	London as a Village	Takumã Kuikuro	20'20"	2017	Documentary
2	ITÃO KUËGÚAs Hiper Mulheres	The Hyperwomen	Carlos Fausto, Leonardo Sette, Takumã Kuikuro	80'00"	2012	Documentary
3	Nguné Elü O Dia em Que. a Lua Menstruou	The Day when the Moon Menstruated	Takumã Kuikuro Maricá Kuikuro	28'00"	2004	Documentary
4	Not applicable	Takumã Kuikuro: A view from the Xingu	Takumã Kuikuro	5'12"	2020, May 15	Record
5	KUGIHE KUËGÜA Hiper Doença	The Hyperdance	Takumã Kuikuro Kleber Mendonça	5'34"	2020	Record
6	(No translation in Carib) Jogos Mundiaies Indigena	Indigenous World Games	Takumã Kuikuro Mahayugi Jair Kuikuro	34'00"	2015	Record
7	AGAHU O Sal Do Xingu	The Salt of Xingu	Takumã Kuikuro	2'02"	2021	Record
8	Not applicable	Kuikuro Response to Covid-19 in Xingu	Takumã Kuikuro Bobi Kuikuro Daniel Kuikuro	5'06"	2020	Record
9	(No translation in Carib) Combatendo a hiperdoença	Kuikuro pos pandemia	Takumã Kuikuro	4'20"	2021	Record
10	Not applicable	Takumã Kuikuro: Covid-19 Brazil - An Amazonian perspective	Takumã Kuikuro	3'01"	2021	Record
11	(No translation in Carib) Incêndios florestais no alto xingu MT	Forest fires in Upper Xingu MT	Takumã Kuikuro	1'30"	2022	Record
12	Pandemia e Fake News no Alto Xingu	Pandemic and Fake News in Upper Xingu	Takumã Kuikuro	15'11"	2021	Record
13	KUARUP	KUARUP	Coletivo Kuikuro de Cinema	2'19"	2020	Record

non-indigenous peoples with whom a commonplace brings them together. By acknowledging that “we are not sharing the same space, but we are sharing the same time of existence” (personal communication-1, 24 June 2022), it becomes a way of experiencing collectivism “where we experience our interdependency, our oneness with all life” (Hooks, 2019, p. 48).

Accordingly, interdependency creates conversations, conflicts, and agreement to live, work, or at least imagine the world together. This negotiation becomes the basis of the politics, or rather, the *Politics of Bodies* (Quintana, 2020). This theoretical framework proposed by the philosopher Quintana (2020) posits that bodies' narratives are fashioned by affective experiences capable of creating disjunctions and displacements between their movements. In other words, the bodies not only resist and endure power structures but reconfigure and reinvent other possibilities of life in common, influencing everyday practices of being together, which might be understood as political subjectivity. Under this umbrella, the results may invite us to place the bodies as centrifugal forces for healing amidst triggers exacerbated by the climate crisis.

After this broad analysis following Quintana's framework, I deliberate the results into two forms of *Alteraciones* (*disruptions*). Following Ranciere's framework, Quintana (2020) posits that the *Alteraciones* are counter-narratives that set an array of disagreements to the *status quo* and thereby enliven emancipation since they fragment ideological discourses embedded in daily life. The *Alteraciones*, therefore, are singular and collective practices driven by the bodies that pursue the renegotiation of time and space. Bodies seek experiences to speak up and create legitimately, materially, and symbolically other forms of self—the basis of alterity (Quintana, 2020). According to the results, I argue that two *Alteraciones* are part of the healing's core: disruption from *Cuerpo-Territorio* and disruption from audiovisual sovereignty.

## 5.1 Disruption from *Cuerpo-Territorio*

The materiality of bodies is considered a vehicle for nourishing intergenerational knowledge and maintaining the healing forces in the territory. For instance, the politics of bodies might enable us to place

the skin upon a material and concrete force for healing. Just as Takumã shows us in the scene of Hyperwomen, the skin is the main character that fosters the movement and displacement of these forces. The skin seems to be penetrated by these forces to take an attitude out of the body. All the community needs to do the same action since the risk of holding attitudes such as laziness in the body is for everyone.

In what follows, the symbolic layer of healing found in the body's biology turns the skin into an esthetic organ that contributes to the understanding that the bodies are not only aligned in an abstract and linear sphere of representation. "There is no dissociation in this Body-Territory" says one of the interviewees to talk about the ways of healing in the Upper Xingu (Personal communication-2, 24 June 2022). Accordingly, most actions and decisions around healing purposes through Takumã's films are mediated by the territory as a healing force by enhancing reciprocity between human bodies and the land. This idea strikes a chord with the category of *Cuerpo-Territorio*, which is proposed by community-based feminism (Cabnal, 2020), and highlights a cosmological view whereby each element and beings on Earth are connected; all of them are part of the intersubjective space. In this respect, healing belongs to the interdependency between political and personal change (López, 2019), from which "by healing yourself, I heal myself [sanando tú, sanando yo, sanas tu]" (Cabnal, 2016, 41:40).

The indigenous feminist Lorena Cabnal indicates, through the documentary "*Sanando nuestro territorio cuerpo-tierra*" (*healing our territory body-land*) (2016, March 16), that we need to embrace our own healing as a cosmic path as we heal our multiple oppressions of colonialism, and all violence experienced by our bodies to create a healing relationship with the Earth and the knowledge of the ancestors and grandmothers. According to Cabnal (2020), healing revitalizes the body and moves some ideas to open up to the public so that the creative capacity becomes stronger as long as the body feels relief. The rituals in the Upper Xingu clearly illustrate this point.

## 5.2 Disruption from audiovisual sovereignty

Takumã captures the nuance of this materiality thanks to the participatory filmmaking practice as an emancipatory practice within knowledge and being, in search of advocacy, enactment, and sovereignty. There is a consolidation of ethical responses enhanced by the Takumã's practice that creates a decolonial audiovisual sovereignty. Gleghorn (2019) indicates that audiovisual sovereignty "(...) is staged in the objectification of watching as a diegetic and reflexive act" (p. 78). I argue that Takumã fosters a key element of healing. It is an act that shapes political subjectivities marked by psychosocial encounters that only occur in the interstice of being with and in the midst of others. And the others are in multiple shapes, colors, and forms of existence—territories, vegetation, animals, and any manifestation of the sacred—as Takumã's films demonstrate.

Takumã's filmmaking practice indicates that it is possible to put into dialog the decolonial turn and the cosmological episteme by understanding that the continuum of reciprocities affects realities not only configured by human beings. The Upper Xingu's collective memory may portray these reciprocities in which the human bodies are equally important as the presence of the sacred, i.e., the river, the red color, and the sounds in the village. By being aware of these reciprocal movements, a collective responsibility comes about, particularly in the complex task of healing. There are no anonymous

bodies or lands in pain anymore. The other's harm and pain are not alien to us, as the Kuarup ritual teaches us, and the Takumã's shots portray through panoramics of thousands of acres destroyed by fires. The damage is narrated and told, as well as what is done to deal with it.

## 6 Conclusion

Overall, community-based feminism (Hooks, 2019; Cabnal, 2020) and the decolonial turn (Fanon 1952/2021, Maldonado-Torres, 2008; Rivera, 2020) framed by the politics of bodies (Quintana, 2020) invite us to break the mind-body dualism, as the Takumã films' view about health taught us. Accordingly, the idea of health as a wholeness challenges many studies around climate change which are framed by the binarism of health/illness and the impossibility of experiencing opposite emotions simultaneously. On the other hand, I also argue, therefore, that audiovisual sovereignty becomes the praxis of the sociology of image (Rivera, 2015). Taking into account that multiple western interpretations overshadow knowledge contained in audiovisual communication (Rivera, 2015; Gleghorn, 2019), we require a praxis that reroutes the gaze to bodies.

In so doing, health and social studies can learn and reflect on the healing process from the climate crisis to open up discussions from Amerindian and community feminism approaches whose diverse forms of communications, namely the skin rituals, and allegories, may serve as knowledge and research production (Rivera, 2015). In this case, they are indicating community-based forms of coping with the consequences brought about by the climate crises.

How will we create epistemic dialogs and *in-disciplines* if we continue seeing the audiovisual world as entertainment instead of knowledge woven from oral traditions? Or if we remain with the colonial prejudices about indigenous cinema as historical archives, or on the contrary, as those foreign beings who will come to save the mistakes mostly made by whiteness as a global project?

Colonialism whitewashes through words (Rivera, 2020); intersectional research, which is considered a remarkable step for health studies (Sultana, 2021), continues framing in traditional research methods whereby the bodies' voices cannot participate. Instead, getting back to the audiovisual production will allow us to understand multiple meanings of the image, the symbol, and even the words (Mora, 2012). Similarly, the filmmaking practice could turn the camera into an emancipatory artifact for human and non-human bodies in climate studies. I argue, therefore, that audiovisual sovereignty might become the praxis of the sociology of image (Rivera, 2012).

Taking into account that multiple Western interpretations overshadow knowledge contained in audiovisual communication (Gleghorn, 2019; Rivera, 2020), the disciplines around climate change cannot pretend to understand systems of knowledge from the same ways in which Western narrative has been recorded: the written.

Disaster risk reduction, seen as the framework of climate change studies (Kelman, 2015), is embedded in epistemic injustice, from which at-risk communities have been predominantly seen as incapable of knowing their geographies. This premise suggests that "mental health is primarily being seen as an outcome of climate change impacts, not a factor in our ability to work to avoid them" (Robison et al., 2022, p. 11).

In conclusion, I do not seek to underestimate the consequences and impacts of climate change on the wellbeing of indigenous

populations. My argument is that the moment that we support colonial discourses in which indigenous communities will be the most affected people in the climate crisis or, in contrast, they will save the planet on their own, we are excluding them from a condition of humanity from which there is the natural dialog between vulnerability and adaptation, and healing and grievance.

The epistemology of cuerpo-territory and therefore the politics of bodies show us that our bodies seek ways of healing and adaptation to new conditions in nature that are understood based on their systems of knowledge that frame the experience of wellbeing and *Buen Vivir*. The rituals and collaborative practices grounded in reciprocity demonstrate forms of adaptation in which mental health becomes a collective responsibility woven into nature at its core.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

The studies involving humans were approved by Research Ethics Facilitator, on behalf of the Queen Mary Ethics of Research Committee, Queen Mary, University of London. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

## Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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