

COMBATING MALNUTRITION AMONG PREGNANT WOMEN, MOTHERS AND BABIES IN THE RURAL AMAZONIAN FOREST: WHAT CAN TELEHEALTH DO?

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Abstract

Purpose: Malnutrition is a current public health problem and a leading cause of childhood morbidity and mortality among the indigenous population in the Amazon forest. This may be related to the nutritional transition observed among indigenous women in Brazil. This research aims to empower health professionals to promote food and nutritional education for mothers and babies living in the forest of the Brazilian state of Amazonas and its Colombian border. We describe our experience using telehealth to combat malnutrition among pregnant women, mothers and babies in the rural Amazonian forest.

Methods: This is a qualitative study that included three interventions: field visits, a scoping review, and online meetings. Data collect from field visits and the scoping review were used to identify demands and incorporate themes discussed in the virtual meetings held at telehealth units. Sessions used the web conferencing platform of the state of Amazonas and were facilitated by Brazilian specialists. Locations were selected according to existence of telehealth site. **Results and Conclusions:** Seven telehealth sessions were held between April and December in 2018 and three in 2019, including 14 different locations equipped with telehealth points, and lasted 120 minutes each. The main findings were that telehealth services can be an instrument to establish a knowledge exchange between health professionals and indigenous people. The participation of indigenous people in social media could be an instrument to maintain their culture and to promote their healthcare, especially traditional and healthy dietary patterns.

Keywords: telemedicine; indigenous peoples; women's health; child health; food and nutrition security; Brazil

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Introduction

Amazonas, named after the river, is the largest state in Brazil with a territorial area of 1,559,168 km² and an estimated 4,144,597 inhabitants in 2019. The demographic concentration is in the range of 2.2 inhabitants/km²; 79.1% living in urban areas and 20.9% in areas considered rural, including the riverside.¹ This is one of the last tropical rainforests crossed by the Amazon River. Isolated native indigenous populations are still found in the Amazonian forest. The river is the state main road and because of that, life there is regulated by the periods of floods and droughts. Long distances and natural barriers hamper continued care provided by multidisciplinary health professional teams.

Data from the First National Survey of Indigenous People's Health and Nutrition in Brazil registered a nutritional transition among Brazilian indigenous women. The women's and children's health indicators measured during the survey were worse than those documented for the national Brazilian population. Moreover, the prevalence rates of anaemia in indigenous children were almost double those reported for non-indigenous Brazilian children.^{2,3} There has been an impoverishment of indigenous diets related to an influx of industrialised foods that is affecting mothers and babies and producing anaemia and malnutrition.⁴ Among the related problems were changes in their dietary habits, replacing traditional food and exclusive breastfeeding with ultra-processed and industrialised foods having low

nutritional value that were made available to the villages.⁵ It is important to revert this and regain better nourishment for indigenous children aged 0-5 years. The family nucleus is paramount in this process and the mothers need to be better educated in relation to satisfying nutritional needs.

This research was designed to find ways to support actions that might contribute to achieving better nutrition among indigenous women and children. The main hypothesis was that empowering primary healthcare professionals (PHCP) to promote food and nutritional education among mothers and babies from the Brazilian Amazon Forest will aid in reducing anaemia and malnutrition among this population. The study used Telehealth Amazonas, the state branch of the Brazilian National Telehealth Network Program, which is present in 62 municipalities of Amazonas and regularly used by PHCP for teleconsulting, online education and telediagnostic activities.⁶ The study territory included demarcated lands near the Brazilian-Colombian border in the districts of Alto Rio Negro and Alto Rio Solimões, where 52 different indigenous ethnic groups live.⁷

This paper describes the methods and research approaches used to construct the virtual meetings and our experience in using telehealth to combat malnutrition among pregnant women, mothers and babies in the rural Amazonian forest.

Methods

This is qualitative study that uses a theoretical framework based on the Grounded Theory (GT), developed by Corbin and Strauss,⁸ which is broadly used in public health studies involving the fields of anthropology and medicine. In GT the researcher tries to grasp reality in circular movements, where he recreates and interprets the dimension of his research object with a constant comparative analysis of data collected.⁹ Therefore, during the study, the categories were progressively identified, and their meanings were analysed and integrated to provide guidelines and help to understand the phenomenon under investigation.

The study took place in three Amazonian urban centres: two in Brazil – São Gabriel da Cachoeira and Tabatinga, and one in Colombia – Letícia and included three interventions: field visits, a scoping review and online meetings. The first two interventions are not in the scope of this paper, that presents the results of the online meetings.

The field visits focused on PHCP and were carried out by two researchers, for seven days. By using a participatory approach, PHCP experiences were accessed alternating individual deep non-structured interviews and interviews with the group, performed at different health facilities. Additionally, river ports and fairs that sell crafts and agriculture products were also visited by the researches in the two cities in Brazil and the visits were guided by local health professionals. All the information collected, including testimonials, places visited and researcher's observations

were documented in personal field diaries. These data are part of another publication, under review.

The scoping review (SR) was developed to confirm the themes for the virtual meetings, to investigate the living and dietary habits of mothers and babies from the Amazon forest and to observe the existence and viability of previous experience with virtual access in the region. It was based on publications that obligatorily included indigenous living in villages or reserves in the Amazon forest, published in Portuguese, English or Spanish and with open access. The following databases were searched: Pubmed/Medline, Embase (both on the biomedical context), Web of Science, Scopus and Scielo (multidisciplinary databases), Social Service Abstracts and Lilacs (Anthropology and Social Sciences focusing on Latin America and Caribbean researcher). There was no date restriction, and the principal search queries were (Indigenous population OR Amazonian Indians OR Amazonian tribes) AND socioeconomic aspects AND (amazon OR Amazonian OR Amazonas OR Amazonia OR Amazonian rain forest OR Amazonian rain forest OR Amazonas rain forest OR Amazonia rainforest OR Amazonian rainforest OR Amazonas rainforest) with minimal syntax adaptations. The review was performed in January 2019 and has been reported.¹⁰

The themes and content for the telehealth sessions were determined based on the observations from the field visits and insight gained from the scoping review. Sessions used the web conferencing platform of the Amazonas and were facilitated by Brazilian specialists and PHCP. The locations were selected based on the previous existence of telehealth in the site. The meetings were designed to address PHCP and to last up to 120 minutes each. The schedule of the sessions and the PHCP participation were based on the discussion and approval during the site visits.

The research was approved by the Research Ethics Committee of Instituto Fernandes Figueira — IFF/FIOCRUZ—RJ/ MS under registration CAAE 85439418.8.0000.5269.

Results

The field visits and the scoping review confirmed that indigenous people have access to the Internet and smartphones, as have being published before¹¹ and that the health teams have used the state telehealth network a few times to access the indigenous population. It also confirmed that the prenatal care was precarious, as also described before¹² and exclusive breastfeeding was reduced and strongly influenced by the subsistence of women and their family.¹³

The scoping review included 21 multidisciplinary studies that addressed topics related to the lifestyle of women and children in the Amazon, their diet during pregnancy and the postpartum period, breastfeeding practices, the introduction of solid foods to the baby, and the care of health services.¹⁰

The results confirmed that traditional food has higher nutritional value than industrialised food and suggested that local cuisine was a source of income for indigenous women in the urban environment as well as a link between ethnicities. The need to incorporate the health promotion paradigm and cover themes such as indigenous acculturation in the Amazonian urban centres, the arrival of the Internet in the villages and the role of distance care, require further investigation to better address the problem.

The new knowledges gained during the field visits and scoping review were used to guide the online meetings. Seven telehealth sessions were held between April and December in 2018. These sessions included 14 different locations equipped with telehealth points, and lasted 120 minutes each. The topics discussed included presentation of the research project; nutrition of pregnant woman; women's nutrition in the puerperium; breastfeeding / nutritional and health related information for a baby's first six months of life; alcoholism in pregnancy; and agroecology and sustainable food systems. Digital graphics for Internet use were especially developed to disseminate all topics. (Figures 1) After obtaining the consent of all involved, the sessions were recorded, edited and became learning tools for health professionals in the Open University of the Unified Health System (UNA-SUS) – a public repository from the federal government.¹⁴

Three virtual meetings happened in 2019, addressing out-of-hospital births; the list of foods offered for babies and mothers at indigenous health facilities; and indigenous peoples' presence on the Internet. (Figure 2)

Three virtual meetings happened in 2019, addressing out-of-hospital births; the list of foods offered for babies and mothers at indigenous health facilities; and indigenous peoples' presence on the Internet. (Figure 2)

Internet connection in the Amazon forest is not always reliable. Despite this, telehealth units of 11 out of the 14 municipalities were able to consistently participate in the conferences with specialists, interacting through video and audio. (Table 1)

Discussion

The indigenous population is growing in the Amazon forest area^{2,3} but it has been noticed that their traditional culture is being missed among the different ethnical groups. This is causing a nutritional transition that has been an object of study of several disciplines and sectors. This was also noted in the current study and the changes in dietary habits may be related to the malnutrition and anaemia diagnosed among indigenous population. To be able to change this, it is also important to emphasise that indigenous people have the right to maintain their culture and the ability to freely communicate their needs, and both of these rights are protected by the United Nations Declaration on the Rights of Indigenous Peoples.¹⁵

The themes selected, and the discussions held during the virtual meetings raised several concerns, as listed in table 1, but also highlighted local solutions that may help PHCP to respond. Language and cultural barriers may be reduced by the collaborative work of health professionals and traditional indigenous leaders, such as the shamans. It will also be important to shift the use of smartphones from a tool to access music and pictures, to include more health-related subjects and positive messages. For the time being, the results of the study are encouraging, and suggest that virtual meetings for sensitising PHCP are viable and may help to review the approach to promoting food and nutritional education among indigenous mothers and their babies. The



Figure 1. Themes in 2018



Figure 2. Themes of 2019.

Table 1. Summary the themes and issues raised during the 2018 telehealth conferences.

Date	Subject	Primary Care Telehealth Points	Issues Raised/Possible Solutions
April	Presentation of the research project	7 sites: Manaus, Tabatinga, Tefé, Barcelos, Itamarati, Rio de Janeiro, and São Paulo de Olivença	<p>Main issues raised:</p> <ol style="list-style-type: none"> 1. The cultural influence in healthcare. 2. Different languages are a barrier between indigenous population and PHCP. 3. In Alto Rio Negro territory, schools and health facilities frequently consume products from subsistence family agriculture. They work in international projects with Peru and Colombia. 4. People of the Maku tribe like to eat a typical food named Turú (<i>Teredo navalis</i>); but its nutritional value is unknown by PHCP 5. What is the best food for pregnant women who are underweight? 6. How to reverse the problem of pregnant women and children under six months who are undernourished due to ultra-processed food consumption 7. Several pregnant women were older than 50 years old in indigenous health facilities in the Alto Rio Negro area. 8. What can PHCP do better to assist pregnant women with hypertension in a distant village? 9. Although the rural areas have received the “Ministry of Health official booklets for pregnant women”, the number of available forms weren’t enough to attend the local demand. 10. How can the district access for the federal document of pregnant be improved? 11. Indigenous people like to watch videos and messages. They have smartphones primarily to listen to music and to take photos because there isn’t Internet connection in the villages. <p>Possible solutions:</p> <ol style="list-style-type: none"> 1. PHCP often work with shamans to assist indigenous children. 2. The “Ten steps for healthy food”, a government project, is present in the villages. 3. One Colombian project has documented traditional indigenous recipes 4. Tabatinga’s maternity is adapted to indigenous mothers. 5. In Alto Rio Solimões territory, there is a project to avoid and prevent alcoholism. 6. In Alto Rio Negro area, PHCP teams have been trying to strengthen the bond with midwives.
May	Nutrition of the pregnant woman	4 sites: Manaus, Manicoré, Tabatinga, Rio de Janeiro	
June	Women's nutrition in the puerperium	6 sites: Manaus, Tefé, Coari, Urucará, Itamarati, Rio de Janeiro	
July	Feeding during the first six months of life and breastfeeding	6 sites: Borba, Alvarães, Eirunepé, Boa Vista do Ramos, Tabatinga and Coari	
August	Feeding and introduction of solid foods to babies	2 sites: Manaus, Rio de Janeiro	
November	Alcoholism in pregnancy (Foetal Alcohol Syndrome)	2 sites: Manaus, Rio de Janeiro	
December	Agroecology and sustainable food systems	2 sites: Manaus, Rio de Janeiro	

results also confirmed the viability of using telehealth as a mean to empower health professional. Once empowered, health professionals will be able to consider the inclusion of face-to-face activities, in areas without telehealth, to educate indigenous women and mothers and reinforce cultural traditions. The materials that were produced during the virtual meetings will be useful for sensitisation activities, recognised as successful in the literature, such as workshops using audio-visual recording of traditional cuisine, building on female protagonist groups^{16,17} and building on previous experience with online meetings carried out with similar objectives.¹⁸

Virtual meetings and face-to-face activities may also be seen as an opportunity to give voice to indigenous people and promote an environment of exchange and dialogue about their eating habits with the team of family healthcare professionals. They may also represent an opportunity to discuss and produce audio-visual files related to ancient feeding practices of indigenous people that may be temporarily forgotten. They can also open a channel for specific group discussions about the protein, caloric and nutritional value of the traditional recipes compared to the new nutritional transition, and the health-related consequences in children and women. The use of Internet and

social networks may help enhancing the network among indigenous women¹⁹ and the effort to also involve PHCP may reinforce a pedagogical interchange²⁰ between the traditional values in the context of being an indigenous women and the biomedical knowledge.²¹

Conclusion

The results suggest that telehealth services are viable in Amazonian urban centres and they could be an important tool to establish a knowledge exchange between health professionals and indigenous people. Promoting the use of social media among indigenous people could also be an instrument to maintain their culture and to promote healthcare, more specifically in relation to traditional and healthy dietary habits. More studies will be necessary to monitor and evaluate the long-term effects of these creative approaches to empower the nutritional and alimentary security of indigenous population. And to evaluate the impact of this strategy on improving the health indicators of mothers and babies of the Amazon territory.

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