# Social representation of malaria from the prespective of miners in Boa Vista – Roraima

## Representação social da malária na perspectiva dos garimpeiros em Boa Vista – Roraima

## Representación social de la malaria en la perspectiva de los mineros de Boa Vista – Roraima

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### RESUMO

**Objetivo:** analisar o núcleo central da representação social acerca da malária na ótica dos garimpeiros e dos indivíduos que exercem atividades laborais em região de garimpo que buscam atendimento no Pronto Atendimento Cosme e Silva em Boa Vista/RR. **Método:** estudo descritivo exploratório de carácter qualitativo delineado por meio da Teoria das Representações Sociais, formulada por Serge Moscovici em 1961. Foram realizadas 72 entrevistas semiestruturadas com garimpeiros. A análise dos dados ocorreu com o auxílio do software OpenEvoc 0.92 desenvolvido pelo Prof. Dr. Hugo Cristo em 2012. **Resultados:** foi constatado que as percepções dos garimpeiros acerca da malária está diretamente relacionada com a sintomatologia da doença, principalmente pelos traumas vivenciados devido a ausência de serviço de saúde disponível no local de trabalho. Enquanto que, as percepções dos garimpeiros sobre o garimpo estão vinculadas a condição econômica deste grupo. **Conclusão:** observa-se que a busca pelo bem- estar financeiro, faz o garimpeiro se submeter às relações extremamente precárias de trabalho, incluindo a exposição ao vetor da malária. **Descritores:** Malária; Mineração; Representação Social.

#### ABSTRACT

**Objective:** to analyze the central nucleus of the social representation about malaria from the perspective of miners and individuals who carry out work activities in a mining region who seek care at the Cosme e Silva Emergency Room in Boa Vista/RR. **Method:** descriptive exploratory study of a qualitative nature outlined through the Theory of Social Representations, formulated by Serge Moscovici in 1961. 72 semi-structured interviews were carried out with miners. Data analysis took place with the aid of the OpenEvoc 0.92 software developed by Prof. Dr. Hugo Cristo in 2012. **Results:** it was found that the prospectors' perceptions about malaria are directly related to the symptoms of the disease, mainly due to the traumas experienced due to the lack of health services available in the workplace. Meanwhile, the prospectors' perceptions about mining are linked to the economic condition of this group. **Conclusion:** it is observed that the search for financial well-being makes the prospector submit to extremely precarious work relationships, including exposure to the malaria vector. **Descriptors:** Malaria; Mining; Social Representation.

#### RESUMEN

**Objetivo:** analizar el núcleo central de la representación social sobre la malaria en la perspectiva de mineros y personas que ejercen actividades laborales en una región minera que buscan atención en el Servicio de Emergencia Cosme e Silva de Boa Vista/RR. **Método:** estudio descriptivo exploratorio de carácter cualitativo esbozado a través de la Teoría de las Representaciones Sociales, formulada por Serge Moscovici en 1961. Se realizaron 72 entrevistas semiestructuradas con mineros. El análisis de datos se llevó a cabo con la ayuda del software OpenEvoc 0.92 desarrollado por el Prof. Dr. Hugo Cristo en 2012. **Resultados:** se encontró que las percepciones de los prospectores sobre la malaria están directamente relacionadas con los síntomas de la enfermedad, principalmente debido a los traumas experimentados por la falta de servicios de salud disponibles en el lugar de trabajo. Por su parte, las percepciones de los buscadores sobre la minería están ligadas a la condición económica de este grupo. **Conclusión**: se observa que la búsqueda de bienestar económico hace que el prospector se someta a relaciones de trabajo extremadamente precarias, incluida la exposición al vector de la malaria. **Descriptores:** Malaria; Minería; Representación Social.

# Introduction

According to the World Health Organization, in 2018 there were about 228 million cases of malaria worldwide.<sup>1</sup> In Brazil, the Amazon region is responsible for the majority of cases of malaria infection, with about 157,454 cases reported in 2019. In the same year, the state of Roraima reported more than 22,000 new cases.<sup>2</sup>

Malaria is characterized as a multifactorial disease, due to the social, economic, political, cultural, behavioral, environmental and biological aspects involved in the health-disease process.<sup>3</sup> In this sense, when considering all these factors, it is pertinent to think that working in endemic and unhealthy places, associated with exposure, such as mining, can favor the illness of the miner, who in their nature has multiple social representations.<sup>4</sup>

Representation is the act of representing something or someone, for this, the individual first needs to know or have contact with the object or subject to be able to represent it. According to the Theory of Social Representations (SRT), social representation is generated by the process of anchoring, which aims to transform something disturbing into something familiar, and by the process of objectification that aims to transform ideas into practice, that is, unites the unfamiliar with reality.<sup>5</sup> With this conceptual and contextual understanding, the need to understand the social representations of miners emerges with the slogans "malaria" and "mining". To this end, the following objectives of this study were outlined: to characterize the sociodemographic profile of miners and to analyze the central core of social representations about malaria, from the perspective of individuals who perform work activities in a mining region in Roraima.

# Method

This is a descriptive exploratory study of a qualitative nature outlined by the SRT, formulated by Serge Moscovici in 1961. The structure of social representations is composed of a central system and a peripheral system, which together make up Vergès's picture of four houses<sup>6</sup> represented in the first figure. The central system is formed by the upper left quadrant, the central nucleus of social representations, in which the most relevant elements for representation are inserted.<sup>7</sup>

1st quadrant	2nd quadrant
<b>Central nucleus</b>	First periphery
3rd quadrant	4th quadrant
Contrast zone	Second periphery

Figure 1- Picture of four houses adapted from Vergès.

The peripheral system is composed of the first and second periphery. It

corresponds to the upper right quadrant, where the peripheral elements closest to the central nucleus are located. It is the lower right quadrant in which the less important words are located and farther from the central nucleus. Finally, the lower left quadrant corresponds to the contrast zone, where are the words that can support the elements of the first periphery.<sup>7</sup>

However, in order to understand the data collected, the study appropriated the elements of the central nucleus, which circumscribe the objective of this research. Data collection took place from July to September 2021, and had as its research field the malaria laboratory of the reference emergency room located in Boa Vista/RR, Brazil.

A total of 72 miners submitted to the Free and Informed Consent Form (ICF) participated in the study. The sample size was based on the considerations made in the study by Wachelke, Wolter and Matos in 2016. The authors found that samples of less than 50 participants are not reliable, since they can cause random results with high variability, while samples of 100 and 200 participants present a similar pattern of results.<sup>8</sup> That said, samples with 50 to 100 participants are considered adequate to obtain valid and satisfactory results.<sup>8</sup>

The exclusion criteria were: miners of foreign nationality, indigenous people, and miners with only 01 episode of malaria, since the individual first needs to know or have contact with the object of research to be able to represent it.

The data collection instruments were: the free word recall test and the semi-structured interview with objective questions to compose the sociodemographic and epidemiological profile of the participants. The Free Word Recall test is a technique developed by Vergès, in 1992, with the aim of understanding the psychological structure of the subjects through verbal and non-verbal inducing stimuli.<sup>9</sup> The verbal inducing terms "malaria" and "mining" were used when each participant was instructed to express the first five words they thought of in front of the terms. They were also instructed on the importance of using isolated words in response to stimuli.

The analysis of the set of evocations obtained in the answers occurred through the OpenEvoc program version 0.92, developed by Prof. Dr. Hugo Cristo Sant'Anna in 2012. It is a Portuguese program, free and accessible to the computer connected to the internet, allowing the collection, import and export of data.10 The OpenEvoc software allows the construction of the structure of social representations, through the analysis of the frequency in which the word is mentioned by the participants and the average order of evocation for this. Then, it is necessary to transcribe the evoked words into Microsoft's® Excel program, crossing one participant per row and one evocation per column in the spreadsheet.<sup>10</sup> Finally, the investigation was in accordance with the ethical principles involving human beings and was approved by the Research Ethics Committee with favorable registration No. 4,910,312.

## **Results and Discussion**

The results and the discussion of the findings were organized into two dimensions, namely: characterization of the social and demographic profile of the miners and the central nucleus, corresponding to the most important words of the social representation of malaria. All of this can be evidenced below:

### Sociodemographic profile of the participants

Of the 72 participants in this study, 57 (79.17%) declared themselves to be men and 15 (20.83%) women, which emphasizes the sexist division of mining work, as it is considered a "heavy and difficult" activity, which may explain the prevalence of men. Another relevant factor is marital and maternal status, which may determine a lower frequency of women in mining activities, since the majority (48.61%) of the research participants declared themselves single to the detriment of (43.06%) for married people.

With regard to place of birth, most of the participants are from the north and northeast of Brazil, which demonstrates the historical relationship with the settlement of the state of Roraima during the crisis of the rubber cycle between the 1910s and 1920s, an event that stimulated the great movement of northeasterners to the territory in search of work. on farms and later in mining activities.<sup>11</sup>

Regarding the age group, there is a variation between 30 and 39 years. The elderly prevail in the minority due to the mining activity causing deleterious effects on health, caused by the noise of the machines, the frequent contact with various diseases, excessive physical exertion and the absence of personal protective equipment (PPE), facilitating the selection and permanence of younger individuals. Specifically, the participants declared that they earned a minimum monthly income of 2,500 reais and a maximum of 75,000 reais. Establishing an average of 12,700 reais per month, which corresponds to 10 minimum wages according to the value assigned in 2022 by Law 14,358/2022.<sup>12</sup> In this sense, it is considered that the quick financial return makes mining an attractive activity for workers at younger ages, which favors the interruption and/or school dropout of this group.<sup>13</sup>

This information, when cross-referenced with our study, corroborates the results to the extent that the characteristics of the participants present a predominance of complete high school and incomplete elementary school. Also from the perspective of the low level of education of the participants, most of them have low-income jobs as their professional occupation (e.g., bricklayer, painter, driver and others), which can motivate the search for work in mining.

Thinking about the health vulnerabilities of miners in the Amazon region is anchored in the low economic conditions, as well as in the reduced schooling of family members and the workers themselves. These factors also reflect on the self-perception of social value that underpins the profession. For many, the extractive activity is a laborious trade that escapes the initial desire of their career, materializing over the years due to the benefits that this activity provides.<sup>14</sup>

### Central core of the social representation of malaria

In the application of the free recall test, 360 words referring to the inducing term "malaria" originated, starting the four-box chart with a mean frequency of 0.56 and an average order of recall of 3. The terms were hierarchized in descending order of frequency with their respective average order of evocations: The central core of the social representations consisted of the group's

memory, reflections of the social and historical conditions and values of the collective, establishing a common and consensual basis among the group, stable and resistant to change.<sup>15</sup>

From the universe of different words evoked by the research participants in relation to the term malaria-inducing, "pain" stands out, mentioned 57 times or by 57 participants, as can be seen in the second figure.





When the participants were asked which of the five terms they evoked was the most important, 19 of the 57 subjects who evoked the term "pain" stated that this was the most important. Their choice was justified by the difficulty in developing mining activities in their presence, evidenced in the reports:

Because I can't work with the pain (Participant 2).

Because it is the worst symptom of malaria (Participant 6).

The pain is very intense in the body, it does not even allow it to work (Participant 17).

Pain is considered an unpleasant experience that affects the individual as a whole, from mere discomfort to a total limitation of their activities.<sup>16</sup> In this sense, for the miner who does not have a fixed monthly income, but earns a value defined by the amount of time he remains in the mine and the hours of work, pain really interferes with his main objective, which is to have an income.

The presence of the terms "bad" and "danger" reveal the feelings that the collective has in relation to malaria, confirming the unpleasant sensations related to the symptoms and contagion. Thus, there is no doubt that the image of the miner continues to have negative connotations due to the high-risk conditions in which the work is carried out: violence, lack of security of the activity, the

participation of vulnerable, poorly qualified labor without legal support.<sup>13</sup>

In this context, work performed in precarious places, with the aim of generating an accumulation of capital and profit, is a fertile ground for suffering and illness of individuals, thus configuring work as pathogenic).<sup>17</sup> Ordinance No. 1339/1999 of the Ministry of Health classifies malaria as an occupational disease due to exposure to Plasmodium, mainly in mining activities, construction of dams or highways, oil extraction and other activities that force workers to enter endemic areas.<sup>4</sup>

Still guided by figure 1, the association of the inducing term "malaria" with its vector "mosquito" was rarely mentioned, 15 participants, which corresponds to 20.8% of the total, revealing the lack of knowledge on the part of the miners in relation to the form of malaria transmission.

However, when asked about the form of malaria transmission, 79.2% (57 participants) associated malaria with its vector, but showed insecurity in the answer, relating the mosquito to the incorrect mode of transmission, believing that it occurs orally when drinking dirty water. Others presented superficial answers or did not know how to answer. An alert for the maintenance of care and the prevention of the disease. The transcript of the main speeches is shown below:

*I don't even know how to answer* [...] *I think it's because of the mosquito, that's what they say around (Participant 12).* 

*It's because of the water* [...] *the nail head lands in the water and when we drink this water we get malaria (Participant 27).* 

I don't know how to answer this question (Participant 42).

In this scenario, the ideal would be for the groups to appropriate this space, especially with regard to the triad - host, agent and environment, always with a view to breaking the chain of transmission. Due to the incipience of this appropriation and consequently or because of it, preventive care could be intensified by understanding the mode of transmission.

In addition, the lack of knowledge about the vectors, their habits and habitat may be associated with reinfections, since prevention measures and the use of PPE (appropriate clothing, repellent, mosquito netting) are not mandatory or present among this population.

Therefore, it is important for health units to pay attention to the information disseminated about vectors and breeding sites. It is important, for example, to inform that the main vector of malaria, Anopheles darlingi, has hematophagic habits during the night, with a unimodal peak (midnight), but the meal can be bimodal, that is, in the morning and afternoon twilight.<sup>18,19</sup>

It is believed that as access to information about the transmission process is disseminated, the behavior of this population in malaria-endemic regions may change to reduce the incidence of disease recurrences. The presence of pathogenic biological agents in the mining favors the unhealthiness of the place and, consequently, the illness of the miners. The absence of on-site health services makes it impossible to diagnose and treat them properly.

The word "treatment" evoked by 12 research participants demonstrates the desire for a cure and the search for medications in order to solve the disorder generated by the disease, which is too difficult, causing self-medication in most cases. This behavior is a major public health problem due to the emergence of resistance to artemisinin and associated drugs, as a result of inappropriate use, the Amazon region faces a significant threat especially in highly mobile populations and in hard-to-reach areas associated with gold mining in Brazil.<sup>20,21</sup>

It is also noteworthy that the association of the inducing term "malaria" with the site of infection "mining" was insufficient, and the term mining was evoked by only 2 participants, that is, more than 97% of the research participants did not associate malaria with mining. The outcome of the structure of the central nucleus of malaria is biological risk, due to occupational exposure to the pathogenic biological agent, mainly due to the unhealthiness of the site. According to the four biohazard classes established by the Ministry of Health, malaria belongs to risk class 2 because it causes infections in humans, has limited potential to spread in the community and spread in the environment, and has effective prophylactic and therapeutic measures.<sup>22</sup>

The risk situation of the miners can be verified through the terms evoked during the interview, with the terms "disease", "mosquito", "mining", "danger" and "bad" being mentioned in their statements::

[...] I work with the risk of getting malaria. She doesn't come after you, it's you who goes after her because she's in the bush (Participant 46).

The suffering is very bad, the disease is a consequence of the work environment (Participant 57).

In the central nucleus, there are the most important words of the social representation of mining, described in the terms - money, work, survival, opportunity, improvement of life, employment and salary - confirming the importance of the economic factor for the miners. All this can be seen in the third figure.



Figure 3 - Central nucleus of the social representation of mining.

When asked about why they frequent mining and why they decide to return to the site, most participants stated that their main socioeconomic activity is mining, due to the non-requirement of qualifications and the quick economic return in the dynamics of work for survival:<sup>13</sup>

There (in the mines) I earn much more than here in the city... I don't have much choice, here in the city I would only earn a minimum wage and I can't live on that amount (Participant 03).

I only go there (in the mines) because of the money (Participant 04).

I'm going there because here in the city there are no jobs and I need to support myself. I want to buy my house soon and the money I make here (in the city) in 1 month I make in 2 days there (in the mine) (Participant 06).

*The money is to change your life, there are a lot of fathers trying to improve their lives* [...]. (Participant 54).

Among the five words evoked, 27 miners chose the term "money" as the most important, reinforcing their importance for frequenting the place. One of the reasons that leads many of the migrants to leave their place of origin and go to the mines are factors such as drought and poverty, forcing them to venture into the expectation of survival and the dream of a better life.<sup>23</sup>

It should be noted that many of the people who work in mining go in the expectation of generating better living conditions for their families. In this context, there is a tendency for children to inherit their parents' social position. However, some escape this rule, although they do not have great economic

conditions to offer quality school education, many of their children break this obstacle and achieve professionalization.

It is noteworthy that, in the central nucleus of the social representation of mining, there are no terms referring to malaria, the unhealthiness of the place or the precarious working conditions. In fact, it demonstrates the perception of mining as something positive in the life of the miner, as an imaginary of wealth production. Mining is beyond the exposure of tropical diseases, since the miners live in barracks or camps, work in precarious ravines and dive with inadequate equipment. In addition, the miners face daily logistical difficulties from the entry of fuel and food, by the control agencies, to the mining areas.<sup>24</sup>

Still under these conditions, when asked about the possibility of giving up work in mining because of the risks, 52.8% of the participants declared that they did not think about it, while 47.2% declared that they thought about giving up the activities at some point in their lives:

Yes, but every time I come back here in the city and see the difficulties to conquer things... then I'll come back (Participant 14).

*Quit... It doesn't make up for so much suffering. Sometimes I think I'm going to die there... because there is no help when we are sick (Participant 20).* 

I've thought about it, but I'm not going to give up now because I haven't achieved my goal yet, which is my house (Participant 23).

No... I don't even see a reason for it, it's my job, my life, I can't abandon everything I'm building (Participant 31).

According to the study carried out in a mining site in the legal Amazon, the miners did not show any desire to abandon the work activities performed by them in the mine, even in the face of the vulnerabilities that the activity implies, due to the benefits that this activity produces, such as a quick financial return, the same perspective observed in our study.<sup>14</sup> Although mining is an unhealthy space. Precarious in many aspects, from transportation to housing, including biological hazards, exposure to disease vectors, chemical hazards, mercury, in addition to the handling of unprotected machinery and violence due to conflicts between miners, indigenous peoples and official inspection agencies, even so the miners do not show any desire to abandon mining activities.

## **Final Considerations**

The research strengthens the empirical knowledge built around mining and the actors who carry it out: adult men, between 30 and 39 years old, predominantly brown and black, without access to higher education, who occupied low-paid jobs.

The outcome of the structure of the central nucleus on mining is the search for financial well-being, a fact that makes the miner submit to extremely precarious labor relations. It is verified that the absence of personal protective equipment and the deficit of safe self-care practices favor the illness of this group.

Thus, it is considered that the term mining triggered several anchoring elements as isolated words to the discourse around social conditions. By

schematically representing the qualitative dimension of the elements associative with mining, survival, employment and income were evidenced as elements of greater expressiveness. However, the theme that is revealed between the lines of this discourse and in the evidence of the words is the social risk anchored by the precarious relationship of work in a space that sometimes also translates into unhealthy. Thus, it is unfinished, it is believed that the findings contribute to the thinking-knowing-doing of health based on the understanding of the social representation of those who circulate in mining areas in Roraima.

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