

ENVIRONMENTAL AND HEALTH IMPACTS OF ILLEGAL GOLD MINING IN THE BOUAFLÉ DEPARTMENT

Abstract:

The Bouaflé département is one of the areas richest in gold deposits in Côte d'Ivoire. Its natural resources have long been the subject of artisanal mining. Today, given the high mineralization of its subsoil, the department attracts people from all walks of life who engage in illegal mining: clandestine gold panning. This is carried out in a haphazard manner, with rudimentary equipment, and involves the use of chemicals such as mercury and its derivatives. Illegal gold mining discharges various types of waste into the environment without any treatment. This causes severe degradation of the natural and human environment through water and soil pollution from chemicals and the resulting unsanitary conditions. This dire situation may be the cause of the serious health problems observed within the mining community. The objective of this study is to determine the health impacts of illegal gold mining on those involved. The methodology used for data collection relied on literature review, field surveys, and observation. Our investigations reveal that most of the small-scale gold miners and non-mining residents surveyed suffer from numerous health conditions linked to the chemical pollution of surface water, the unsanitary conditions of their living environment, and, above all, their working conditions in artisanal mines. The findings highlight the health risks and illnesses associated with illegal gold mining in the Bouaflé department.

Key words:-

ENVIRONMENT, DISEASES, ILLÉGALE GOLD MINING, POPULATION, HEALTH

Introduction:

Côte d'Ivoire's mining policy has breathed new life into its economy, which had long been dependent on agriculture. This political commitment has encouraged the establishment of several industrial mining companies and the opening of artisanal mines. The country is home to more than 1,000 artisanal gold mining sites, and more than 500,000 people in rural areas make their living from this activity (Ministry of Mines and Geology, 2013). The Bouaflé department, located in the central-western part of Côte d'Ivoire, is at the heart of this phenomenon of both industrial and artisanal mining, as it is the area with the richest gold deposits in the country (Ministry of Mines and Geology, 2014). Consequently, several mining companies have operated in succession: Angovia Mining (1980–1991), Compagnie Minière d'Afrique (1993–2003), Cluff Mining PLC (2004–2012), Amara Mining PLC (2013–2015), and Persus Mining since 2015. In addition to these, there has been a proliferation of gold panning sites throughout the area. Gold panning is a small-scale mining activity that primarily uses manual methods and rudimentary tools (Jacques, 2001). When it is carried out illegally without any authorization and involves the use of chemicals (mercury, cyanide), it is referred to as clandestine gold mining. However, this illegal artisanal mining activity causes serious damage to natural resources and human health Jacques et al. (2004). The careless handling of toxic chemicals (cyanide, mercury), as well as poor hygiene and dietary conditions and risky behaviors, are responsible for environmental degradation and numerous diseases contracted by local populations. People living in gold mining areas are often affected by malaria, diarrheal diseases, acute respiratory infections, and STI/HIV/AIDS (Affessi, 2016). Over the years, these effects have intensified due to the proliferation of illegal gold mining sites, which have become hotspots for

population surges, insecurity, drug trafficking, and ecological disruption (Goh, 2016). So, what is the impact of illegal gold mining on the health of those who work in it in the Bouaflé department? This study aims to assess the health consequences of illegal gold mining in the Bouaflé department, in Côte d'Ivoire.

I MATERIALS AND METHODS

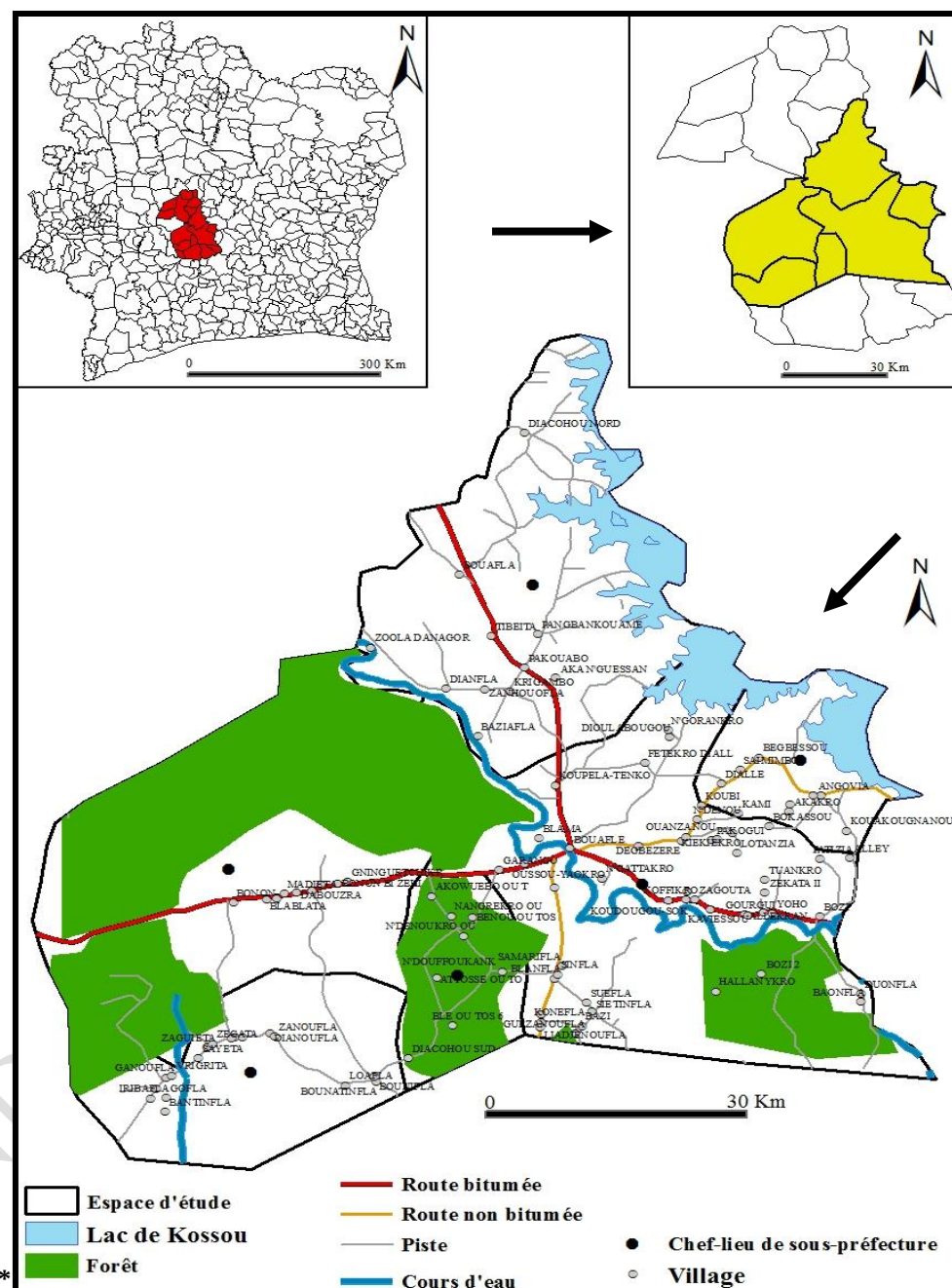
1.1. Overview of the study area

The Bouaflé Department is located in central-western Côte d'Ivoire, 60 km from Yamoussoukro, the political and administrative capital, and 310 km from Abidjan, the economic capital. It covers an area of 4,222.48 km². It comprises two municipalities—Bouaflé and Bonon—and includes seven subprefectures: Bouaflé, Gbégbessou, Pakouabo, Tibiéta, Bonon, Zaguéta, and N'douffoukankro. Major gold panning sites are found in three subprefectures: the subprefecture of Bouaflé, which includes the villages of Allékran, Kaviéssou, and Duonfla; the subprefecture of Bégbessou, which includes the villages of Angovia, Allahou-Bazi, and Kouakou Gnanou; and the subprefecture of Pakouabo, with the locality of Pangba-kouamékro. The population of the Bouaflé department is 300,305 inhabitants (RGPH, 2021). The mining villages have populations ranging from 400 to 6,000 inhabitants depending on their gold potential (Table 1). The department's capital is Bouaflé with 213,967 inhabitants, followed by the secondary town of Bonon, which has a population of 116,871 according to the same source.

Table 1: Populations of the mining villages surveyed in the Bouaflé Department

SUB-PREFECTURES	MINING TOWNS		POPULATIONS
BEBGESSOU	Angovia		4.382
	Allahou-Bazi		3.678
	Kouakou Gnanou		1.832
PAKOUABO	Pangba Kouamékro		6.565
	Allékran		432
BOUAFLE	Kaviéssou		1.640
	Duonfla		4.979
TOTAL			23.008

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Figure 1: Location of the study area (Source BNETD/ CCT, 2023)

76 1.2. Methodological Approach

During this study, two data collection methods were used : literature review and field surveys. Field data collection was conducted in two ways : interviews and questionnaires. The interviews were conducted using an interview guide with administrative and political officials, village leaders, and mining company executives. As for the questionnaires, they were administered to the population (household heads, villagers, and gold miners) individually and through focus groups. The sampling method adopted for our study was purposive sampling. This method involves systematically selecting individuals who are directly or indirectly affected by gold mining. This approach is based on Seager's theory (1993), which states that people living within a radius of 1 to 5 kilometers of industrial facilities are more exposed to industrial pollution. Our study area is the Bouaflé department. Within this department, seven (7) mining villages were selected as the survey area. These mining villages have a population of 23,008 inhabitants (RGPH 2021), as shown in Table 1. Thus, due to the large size of the population and the impossibility of surveying the entire population of the study area, selecting a sample became necessary. Therefore, the sample size that could validly represent our area is one-hundredth of the base population, or 230 individuals. However, in quantitative terms, in each of these villages, we surveyed 40 people from all socio-professional categories using the same methodology. This gives us a total of 280 people as the actual sample size for our study. The table below summarizes the socio-professional categories of the 280 people surveyed as part of our study.

Table 2: Surveyed populations by village

Villages surveyed	Category of respondents			
	Household heads	Mining operators	Landowners	Total
Angovia	10	24	6	40
Allahou-Bazi,	10	23	7	40
Pangbakouamékro	11	24	5	40
Kouakougnanou.	15	19	6	40
Alékran	11	20	9	40
Kaviéssou	12	19	8	40
Duonfla	11	21	8	40
TOTAL	80	150	50	280

While we have three categories of respondents, the surveys conducted specifically focused on two main groups : gold panners (miners), numbering 150, and non-miners (household heads and landowners), numbering 130, for a total of 280 individuals. The data from these surveys were then analyzed.

1.3 Data Processing Techniques

Data processing and analysis were conducted as part of the quantitative and qualitative research methodology adopted. This analysis was performed using Word, Excel 2013, EpiData, Adobe Illustrator, and Sphinx 5. The resulting data were presented in the form of statistical tables, graphs, and maps.

2. RESULTS AND DISCUSSION

The results obtained cover a variety of diseases encountered at gold panning sites and in surrounding villages. These diseases have been grouped into three categories : diseases related to the physical labor of gold panning, diseases related to the living conditions of mining village populations, and diseases related to lifestyle (risky behaviors).

2.1. Health Issues Arising from Physical Labor in Gold Mining

Across all gold panning sites in the Bouaflé department, numerous health issues are associated with gold mining operations, the arduous nature of the work, the physical endurance required of gold panners, and workplace accidents. Those affected by these illnesses include miners, crushers, ore transporters, and often washers. They generally suffer from traumatic injuries, acute respiratory infections, skin conditions, and chronic coughs caused by exposure to chemicals and dust. The table below shows the distribution of sick gold miners by age for each surveyed site.

Table 3: Proportion of diseases directly attributable to gold mining, by age (Source : Our Surveys, 2023)

Villages	Physical trauma (Injuries)			Acute respiratory infection			Skin disease			Chronic cough			Total
	-15 ans	16-45	+45	-15 ans	16-45	+45	-15 ans	16- 45	+45	-15 ans	16-45	+45	
Angovia	1	5	1	0	10	2	0	3	1	0	1	0	24
Allahou	2	2	3	0	4	1	2	5	1	0	2	1	23
Kouakoug.	2	1	5	0	5	4	1	1	2	1	0	2	24
Pangba.	0	7	0	0	8	0	0	3	0	0	1	0	19
Allekran	0	4	2	0	4	0	0	3	2	1	3	1	20
Kaviéssou	1	5	0	0	6	0	0	3	1	0	3	0	19
Duonfla	0	4	1	0	5	0	0	7	0	0	4	0	21
Total	06	28	12	00	42	07	03	25	07	02	14	04	150
%	4	18.67	8	00	28	4.67	2	16.67	4.67	1.33	9.33	2.66	100 %
Total %	30,67			32.67			23,34			13.32			100 %

According to our surveys, of the 150 gold miners surveyed in the seven villages, 13.32% suffer from chronic cough; 23.34% suffer from skin conditions; 32.67% complain of respiratory illnesses; and 30.67% suffer from injuries resulting from workplace accidents. Among these sick gold miners, 72.67% are young people aged 16 to 45, 20% are adults over 45, and 7.33% are children under 15.

In light of these findings, it is clear that gold panning is primarily a small-scale, artisanal activity in which most of the work is done by hand. The various stages of the process, from gold extraction to refining, expose miners to numerous health risks that can lead to disease. The most common occupational diseases that gold miners are likely to develop as a result of long-term exposure in the gold mining environment are silicosis, pulmonary tuberculosis, chronic obstructive pulmonary disease, occupational asthma, erosion of the nasal cavity and nose, diseases caused by ionizing radiation, noise-induced hearing loss, whole-body and arm vibration syndrome, as well as repetitive strain injuries (Borrhalho 2013). In the Bouaflé department, gold miners are more prone to respiratory diseases, physical trauma (injuries), skin conditions, and chronic coughs. In fact, respiratory diseases such as Acute Respiratory Infections (ARI) are the most common at gold mining sites, accounting for over 32% of cases, 28% of whom are between the ages of 16 and 45. Health statistics from 2017 at the health centers in Angovia, Allahou-Bazi, and Kouakougnanou show that nearly 38% of patients seeking care suffer from ARIs and are all young (under 45 years old). These results are similar to those obtained by (Roamba 2014) in the rural commune of Bouroum in Burkina Faso, who states that ARIs are the most common illnesses among gold miners. According to the same study, these infections are caused by gold miners' continuous exposure to dust and chemicals, as well as by the amalgamation of mercury with bare hands and moisture in the pits. Locally, this infection is believed to be caused by high levels of dust in the air, which in turn is caused by a constant stream of ore-hauling trucks and gold miners' motorcycles traveling back and forth between the pits and the ore crushing and washing sites located on the outskirts of the villages. Regarding physical trauma, a significant proportion of gold miners report having suffered, at least once, a serious or minor injury that resulted in temporary work stoppage. According to our surveys, 30.67% of gold miners suffer from physical trauma. Young people, aged 16 to 45, account for 18.67% of these ill gold miners. This finding is supported by that of Obase (2018), who states that one of the main health problems faced by young miners in eastern Cameroon is musculoskeletal issues, accounting for 35.6% of cases. Studies conducted in gold mines in the Katanga province of the Congo have shown high rates of minor to moderate accidents (72%), fatal accidents (2.5%), and other problems such as back pain (64%) (Elenge 2013). These workplace injuries and accidents are caused by rockfalls; the use of tools; a lack of protective equipment and workplace safety measures; the physical demands and arduous nature of the work; and, above all, the abuse of amphetamines, drugs, and alcohol. The informal nature of artisanal mining operations, the lack of safety awareness, and the failure to enforce any health and safety regulations often account for miners' injuries (ILO, 1999). (Hentschel et al. 2002) argue that rockfalls and cave-ins are among the most frequently cited causes of accidents in small-scale mines. These accidents are often fatal. During our investigations, we were informed of the accidental death of six people in Angovia following a tunnel collapse in a vein. (Saulo et al. 2004) reported approximately 2 to 5 accidental deaths each year in Indonesia. They are supported by (Roland 2003), who obtained similar results. According to him, at least 28 miners were killed by landslides in Colombia, and many were reported missing. The most common causes of death are tunnel collapses (65.8%) and landslides (31.6%), especially during the rainy season Obase et al. (2018).

As for skin diseases, 23.34% of gold miners in the Bouaflé department are affected. This figure is higher than that reported by Joseph (2008), who found that 17.7% of gold miners in Obuasi, Ghana, suffered from skin diseases. The high prevalence of dermatosis in the Bouaflé department can be attributed to the improper handling of chemicals by gold miners. Regarding chronic cough, our study shows a prevalence of 13.32% of miners suffering from this condition. These results are similar to those obtained by Myriam et al. (2011), who reported that 17.5% of gold miners in Katanga suffer from coughing. According to (Obase. R et al. 2018), this prevalence is much higher than the two previous studies, as he states that 31% of gold miners suffer from coughs in the Batouri gold-mining district in eastern Cameroon. Among gold miners, this disease is caused by the inhalation of siliceous substances and dust particles Obase et al. (2018), (Ronald 2003) and by the careless handling of mercury during gold processing (Jason et al. 2002). In short, occupational diseases affect all age groups of gold miners ; however, the primary victims remain young people aged 16 to 45, accounting for more than 72%.

3.2. Diseases linked to the environmental conditions of gold panners and non-miners by educational level

In mining villages, gold panners live in précarisés, unsanitary houssine without access to drinking water. Their living conditions affect the sanitaire conditions of the mining villages. This leads to diseases such as malaria, diarrhea, digestive disorders, and typhoid fever, which affect the entire mining community. The field survey confirms the presence of infectious diseases caused by unsanitary environmental conditions and surface water pollution (Photo 1). All of the gold miners surveyed (150) reported having been sick at least once since they began this work. The majority of these miners who have been sick (72.67%) are male and are between the ages of 16 and 45 (Table 1). Of this total, 96 have no formal education and 45 have completed primary school, representing 64% and 30%, respectively (Table 2). Among the non-mining villagers surveyed (130), the highest level of education is primary school, at 52.31% (Table 3). These relatively low levels of education are one of the factors explaining the prevalence of diseases rampant in mining villages. Indeed, 52% of gold miners frequently suffer from malaria, while 51.54% of non-miners have been affected by it. Furthermore, 26% of the gold miners surveyed suffer from diarrhea, while 26.92% of the local population experienced the same condition. Gold miners, who frequently suffer from digestive disorders, have a lower rate (8%) than non-mining communities (13.08%). Finally, the proportion of gold miners who frequently suffer from typhoid fever (14%) is higher than that of the non-mining population (8.46%). Figure 1 shows the prevalence of these diseases among both gold miners and non-miners.

Table 2 : Distribution of diseases related to living conditions by educational level of the gold miners surveyed

Diseases	Educational level of gold miners			Number of gold miners who have been ill	Percentages (%)
	No level	Grade Elementary	Level High School		
Malaria	48	26	4	78	52
Diarrhea	25	12	2	39	26
Digestive disorder	11	1	0	12	8
Typhoid fever	12	6	3	21	14
Total	96	45	09		

Percentages (%)	64	30	06	150	100
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Source: Our surveys, 2023

Table 3 : Distribution of lifestyle-related diseases by educational level among non-minors surveyed

Diseases	Educational level of gold miners				Number of non-gold miners who have been ill	Pourcentages (%)
	No level	Grade Elementary	Level High School	Next level		
Malaria	12	39	10	6	67	51.54
Diarrhea	9	18	6	2	35	26.92
Digestive disorder	6	7	3	1	17	13.08
Typhoidfever	5	4	2	0	11	8.46
Total	32	68	21	09	130	100
Pourcentages (%)	24.62	52.31	16.15	6.92		

Source: Our surveys, 2023

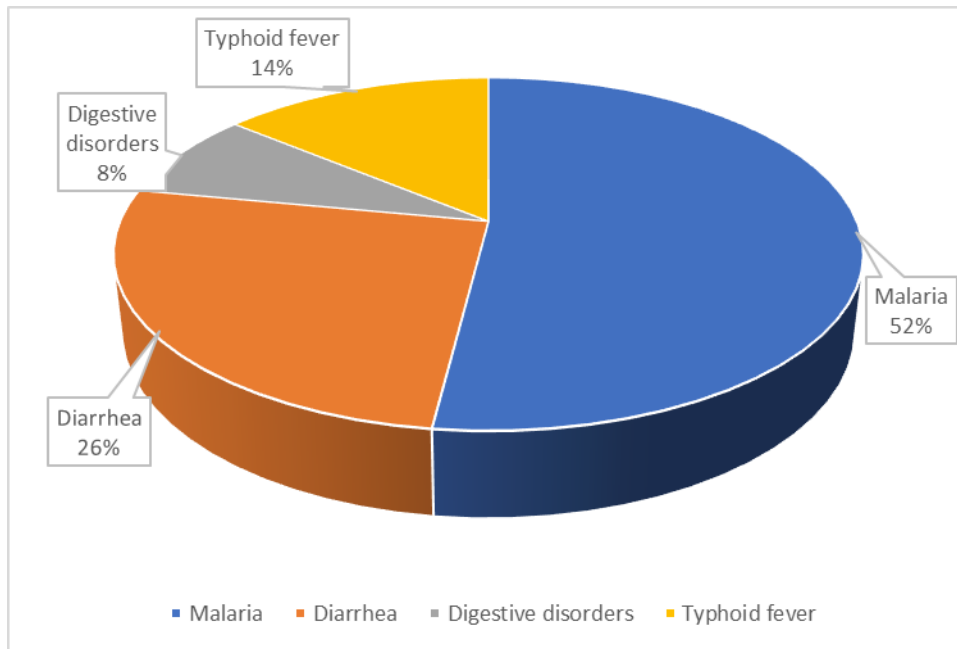


Figure 2: Proportion of diseases linked to the state of the environment and the living conditions of gold miners (Source : Our surveys, 2023)

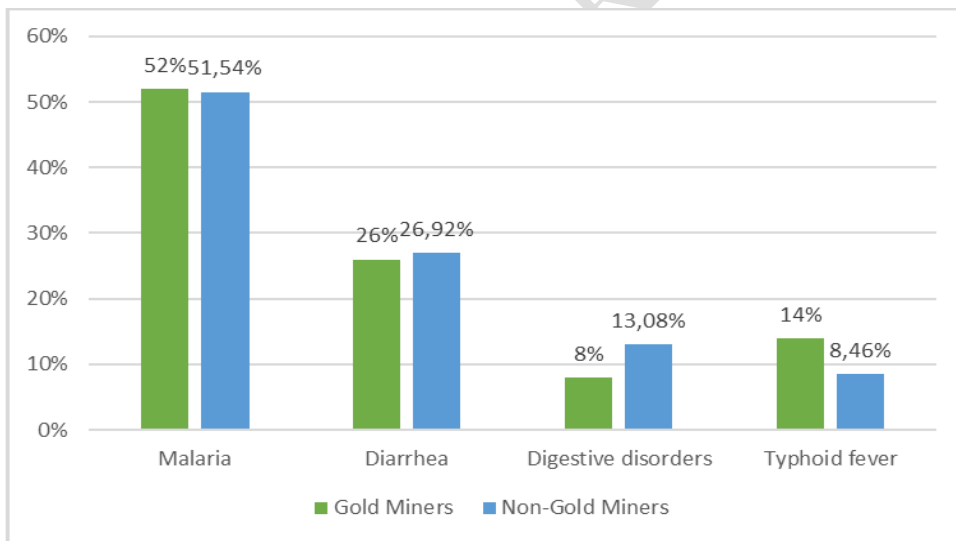


Figure 2: Proportion of diseases observed among gold miners and communities living near mining sites



Figure 3 : Conditions in the gold miners' living environment and pollution in waterways (Source : Our surveys, 2023)

At artisanal gold mining sites in the Bouaflé department, waterborne diseases include malaria, diarrhea, typhoid fever, and digestive disorders. These various ailments stem from the unsanitary living conditions of the gold miners and, above all, from the quality of the water they use on a daily basis. In the health centers of the villages surveyed in 2018, malaria was the leading cause of consultation among rural populations, with a prevalence rate of 43%. In contrast, the survey of 150 gold miners shows that 52% of them frequently suffer from malaria—that is, 78 people, of whom 48 have no formal education and 26 have completed primary school. The survey of 130 non-miners shows a 51.54% prevalence rate of malaria, or 67 individuals with the disease, 39 of whom have a primary school education.

These results show that more than half of the mining community in Bouaflé Department is affected by malaria. The prevalence of this disease is undoubtedly linked to the unsanitary living conditions of gold miners. These unsanitary conditions are, in turn, linked to a lack of knowledge of basic hygiene rules among gold miners—the majority of whom have no formal education (64%)—and among the local population in general, who have a low level of education (52.31%). Indeed, at all gold panning sites in the Bouaflé department, stagnant, unsanitary water is present (Photo 1). This water is conducive to the spread of malaria, a parasitic disease, and is also a source of poisoning (Affessi 2016). The existence of these numerous water-filled pits and trenches in mining communities serves as breeding sites for mosquitoes that transmit the malaria parasite (**Obase, 2018**). In his view, the high prevalence of malaria in the mining communities of Kambélé (37.5%) and Dem (13.8%) compared to the non-mining community in the town of Batouri (10.0%) is a result of this finding. The study conducted in French Guiana shows a high prevalence of malaria, approaching 46.4%, with 18.7% of illegal gold miners carrying the disease (**Maylis . 2015**). The results obtained by (**Mazuir, 2017**) in Brazil are much higher than ours. In fact, 93% of illegal gold miners living in the heart of the Amazon rainforest are victims of malaria. Malaria is the most widespread vector-borne disease in artisanal gold mines and is caused by unsanitary conditions and the presence of pools of water in abandoned pits (**WHO, 2017**). Furthermore, gold miners contribute to the spread of this disease through the stagnation of toilet water and the accumulation of excreta near their living quarters (**Sawadogo, 2011**). Thus, the behavior of gold miners and the silence of the non-mining population indicate that their level of education has a significant impact on the prevalence and persistence of malaria. There is therefore a consistent link between rising malaria prevalence rates and artisanal mining activities **Berger et al. (2012)**. Several factors explain this correlation and the persistence of malaria in mining areas: the lack of preventive measures (mosquito nets), the creation of stagnant water pools, the large influx of a non-immune migrant population into a pandemic region, and the limited reach of public health interventions in mining regions that are often remote or inaccessible(**Crompton, 2002**).

Regarding diarrhea, it ranks second with 26% of cases among gold miners and a similar rate among non-miners. In total, out of 74 individuals who reported diarrhea, 34 had no formal education and 30 had a primary school education, representing 45.94% and 40.54%, respectively. These results confirm that low levels of schooling negatively influence the prevalence of this condition. In other words, the less educated the gold panners are, the more unsanitary their living conditions are, and the more likely they are to suffer from diarrhea. In fact, gold miners living at gold mining sites consume poor-quality water. This situation is linked not only to the availability of water resources, but also, to a large extent, to the miners' lack of knowledge about hygiene and sanitation. These waters, already polluted by mining activities, are also contaminated by wastewater from latrines. Thus, the quality of the living environment is considered a contributing factor to waterborne diseases at gold mining sites. This is corroborated by the study conducted by (Crompton, 2002). (Roamba 2014), which states that the high rate of disease and the prevalence of epidemics at gold panning sites could be due to poor hygiene and high population density. In fact, 81.3% of gold miners (diggers and waste rock washers) consume unsafe well water at extraction and residential sites. Consequently, they are susceptible to diarrheal diseases that could escalate into epidemics. With regard to typhoid fever, it is important to note that it is a bacterial infection of the intestinal tract and bloodstream. It is caused by the consumption of contaminated drinking water and food contaminated with feces and urine (WHO 2019). Indeed, in mining villages, unsanitary conditions and surface water pollution unfortunately lead to this disease. The prevalence of this disease among gold panners (14%) is higher than that of the non-mining population (8.46%). Regarding digestive disorders, the opposite pattern is observed in the prevalence of illness between gold miners and non-miners. In fact, non-mining communities (13.08%) reporting constant stomach pain are significantly higher than among gold miners (8%). This analysis suggests that the environmental illnesses affecting gold miners are caused by poor hygiene in their living and working environments, which stems from the low level of education among the miners themselves.

3.3. Diseases linked to risky behaviors at gold mining sites

The reckless and irresponsible behavior of gold miners is the root cause of diseases such as sexually transmitted infections (STIs), HIV/AIDS, and substance abuse. This reckless behavior is due to alcohol abuse and the use of amphetamines and other drugs at mining sites. Out of a total population of 280 people across all categories, 150 gold miners were interviewed. Among them, 86 miners reported regularly using amphetamines and other stimulants before working. Twenty-three people, or 15.33% of the miners, reported being addicted to substances, as drug use occurs daily and in sync with the work schedule. Regarding the non-mining population, out of a total of 130 people, 7 stated that they are addicted to the local drink called "koutoukou," which they consume every day. The amount consumed ranges from 0.40 liters to 1.25 liters per day. Regarding sexually transmitted infections, out of 150 gold miners, 9 men (6%) admitted to having contracted one. Among the non-mining communities surveyed (130), the majority of young men (68%) admitted to having sought the services of sex workers who had come to the area following the opening of the mine. However, they claim to take precautions before engaging in such activity. Despite this awareness, 13.84% of them have had an STI or STD at least once. The graph below shows the proportion of diseases linked to risky behaviors in the mining villages surveyed.

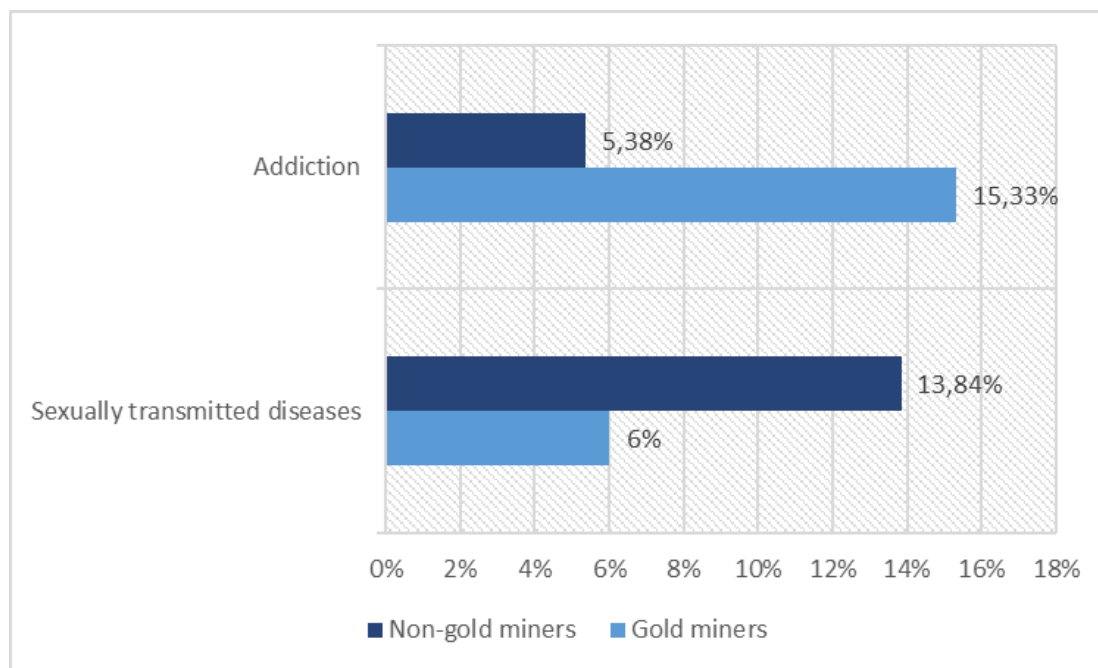


Figure 3: Proportion of diseases linked to risky behaviors

The category of gold miners most prone to using drugs (marijuana) and amphetamines is that of the diggers or prospectors. They use these drugs to gain the physical strength and courage they need. The dose taken reflects both the physical and mental strength put to the test during the work (Mégret, 2007). Daily use of these major stimulants makes them dependent, and they cannot work without using drugs. Of 150 gold miners surveyed, 86 reported regularly using amphetamines and other stimulants before working. Twenty-three people, or 15.33% of them, reported being addicted to substances because they use drugs daily before descending into the shafts. As for the non-mining population, they tend to consume adulterated alcohol to ensure the safety of their sites or simply out of idleness. Thus, out of a total of 130 people, 7 reported being addicted to the local drink called “koutoukou,” which they consume every day (Figure 3). This addiction on both sides leads to behavioral disorders, including sexual dysfunction, which in turn exposes them to sexually transmitted diseases. At the gold mining sites, 9 people or 6% of the miners reported having contracted a sexually transmitted disease such as gonorrhea. As for those who are not miners, 68% admitted to having visited prostitutes. 13.84% of them contracted sexually transmitted infections (Figure 3). According to them, the source of these diseases is linked not only to visiting prostitutes but also, and above all, to the multiple sexual relationships they maintain with young women in the village; these women are often in relationships with gold miners who have temporarily made a fortune. This result is significantly lower than that reported by (Sawadogo, 2011), who documented 456 infected men in Burkina Faso between 2005 and 2009. The fact that these figures are higher in Burkina Faso could be attributed to the high population density in these mines, the lack of awareness among gold panners, and the weakness of the healthcare system. Nevertheless, in the artisanal mines of Bouaflé, sexually transmitted diseases are present and could easily lead to the transmission of HIV/AIDS. This is because the gold miners have never been screened, nor educated about this pandemic, much less provided with means of protection against STIs. This finding is sufficiently supported by several authors. Indeed, data from the socioeconomic survey conducted in Angovia and Allahou-Bazi in 2007 already indicate a fairly high prevalence of HIV/AIDS among pregnant women (Goh, 2016). A case of an HIV-positive gold miner in Tatelu, Indonesia, was reported by Saulo et al. (2004). According to the findings of Kéita (2001), in certain artisanal mines in Kéniéba, Mali, sexually transmitted diseases affect two (2) out of five (5) gold miners, and the prevalence of HIV/AIDS is around 20% among gold miners. A recent study

conducted in Burkina Faso shows that the HIV/AIDS prevalence rate in mining communities is high at 6.5%, while the overall prevalence in the country was around 1.2% in 2008 (National Council for the Fight Against AIDS and STIs 2010). These results vary and differ significantly from one country to another. In Tanzania, at two artisanal mining sites, approximately 15% of men and 23% of women were infected with HIV. In neighboring non-mining communities, the rates were 16% for men and 18% for women **Clift et al. (2003)**. Several factors contribute to this outcome: high levels of immigration, a significant presence of sex workers, substance abuse, and beliefs related to sexual practices. For some gold miners in the Bouaflé department, the belief that engaging in unhealthy sexual practices increases their chances of finding gold is widely held. Thus, the miners, sometimes covered in mud, have unprotected sex with sex workers for large sums of money to uphold this belief, hoping that gold will appear to them. For others, this situation is explained by their abuse of the substances on which they depend. They are constantly drunk. In this state, they are very often drawn to the high number of sex workers at the gold mining sites who offer them better experiences at better prices. Caught in this hellish trap, they lose themselves and give in to this vice, which becomes a habit after work. Thus, the high prevalence of HIV in mining communities is also due to an increase in the sex trade, which is openly practiced there **Kwesi (2011)**. Moreover, it is worth noting that 6% of gold miners in the Bouaflé department are victims of STIs and are at greater risk of HIV/AIDS, which could affect the surrounding village populations if no action is taken.

CONCLUSION

Artisanal gold mining contributes to the survival of the ever-growing rural population and plays an important role in the local economy and development of certain regions of Côte d'Ivoire. Despite its importance, artisanal gold mining has become a clandestine and illegal activity that uses various chemicals in the extraction of gold. As a result, gold panning sites have become major sources of pollution, unsanitary conditions, and insecurity. This situation exposes gold panners and other rural populations living near artisanal mines to disease. Added to this are other health risk factors such as harsh working conditions, artisanal gold extraction techniques, the massive influx of people from diverse backgrounds to the sites, risky behaviors, inadequate infrastructure and sanitation facilities, and the fact that gold miners do not visit health centers. Thus, the most common diseases recorded at gold mining sites in the Bouaflé department are primarily malaria, acute respiratory infections, physical injuries, diarrhea, skin diseases, chronic coughs, and sexually transmitted infections. These diseases affect all categories of gold miners and spread to surrounding communities. However, those most at risk for ARIs and skin diseases are the gold washers and refiners. Well diggers are most at risk for injuries and accidents.

Finally, this study has shown that numerous diseases are prevalent and persistent at gold mining sites in the Bouaflé department. These diseases are linked to technical, human, and environmental factors⁹

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