

Research Article

Cholera: Knowledge, Attitudes and Practices from Indigenous Peoples of Mombénzélé in Likouala to the Republic of Congo

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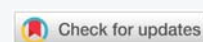
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Keywords: Cholera; Knowledge; Attitudes; Practices; Indigenous peoples; Republic of Congo



Abstract

Introduction: In the Republic of Congo, Mombénzélé village's an area endemic for cholera where environmental and socio-economic factors favor the persistence of the epidemic. This study assessed the knowledge, attitudes, and practices (KAP) of the indigenous peoples of Mombénzélé regarding cholera to design culturally appropriate and sustainable prevention strategies.

Materials and methods: This was a preliminary cross-sectional pilot study, descriptive and analytical in nature, conducted from April 21 to 31, 2026, in the indigenous community of Mombénzélé (Impfondo district, Republic of Congo). The study assessed adults. Convenience sampling was used. Data were collected via a questionnaire in Lingala and face-to-face interviews, with secure data entry on tablets. Analysis using SPSS, including socio-demographic profiles, KAP variables, and chi-square tests ($p < 0.05$), was conducted in strict compliance with ethical principles and anonymization guidelines.

Results: The population studied is predominantly male (60%) and without formal education (92%). Cholera is largely unknown to 92% of individuals, who believe exclusively in mystical causes. Hygiene practices are dangerous, with a complete lack of water treatment (100%) and systematic recourse to traditional healers (60%). Vulnerability is exacerbated by open defecation (56% in the river) and a refusal to use chlorinated water (88%). Sociodemographic factors significantly influence behaviors, notably age, which impacts funeral practices ($p = 0.033$), and educational level, which determines access to the river ($p = 0.0033$). The main activity influences the consumption of treated water ($p = 0.0218$) and determines ($p = 0.000026$) funeral practices. Household size impacts the perception of cholera lethality ($p = 0.009$) and guides the choice of funeral practices ($p = 0.045$).

Discussion: A cholera epidemic has struck the Mombénzélé village, affecting 96% of adults and exacerbated by a complete lack of awareness of the symptoms and a rejection of chlorinated water. The health crisis has driven 76% of the population to traditional medicine.

Conclusion: To contain the health crisis in Mombénzélé, it's essential to deploy a strategy combining the training of bilingual mediators and the improvement of water infrastructure, in order to overcome the lack of information on the transmission of cholera and to adapt prevention to the realities and cultural barriers of the indigenous community.

Introduction

Cholera remains a major public health problem worldwide, particularly in sub-Saharan Africa, where access to safe drinking water and sanitation is limited [1,2]. In the

Republic of Congo, the Likouala prefecture has historically been recognized as an endemic area for this acute diarrheal disease, due to its dense hydrographic network and recurring floods [3]. Within this region, Mombénzélé village is home to a diverse population, including a large proportion of



indigenous peoples. These communities, often marginalized, face increased socio-economic and health vulnerabilities that disproportionately expose them to epidemic risks.

The determinants of cholera persistence aren't solely environmental; they are also deeply rooted in human factors. The population's knowledge of modes of transmission, their attitudes towards the disease, and their daily hygiene practices play a crucial role in the emergence and spread of epidemic outbreaks [4].

Among the indigenous peoples of Mombézzélé village, cultural perceptions of illness, the use of traditional medicine, and specific lifestyles directly influence health risk management. To date, standardized public health interventions have often overlooked these cultural and contextual specificities, thus limiting the effectiveness of prevention campaigns.

To design appropriate and sustainable response strategies, it's essential to understand the internal dynamics of this community. This Knowledge, Attitudes, and Practices (KAP) study is designed with this in mind. It aims to identify information gaps, limiting beliefs, and risk behaviors specific to the indigenous peoples of Mombézzélé village in the face of cholera.

The overall objective of this study is to assess the knowledge, attitudes, and practices of the indigenous peoples of Mombézzélé village regarding cholera in order to guide future health interventions. Specifically, the study will first measure their level of knowledge about the causes and symptoms of the disease. Next, it'll analyze their attitudes toward preventive measures and modern healthcare facilities. Finally, it'll identify actual practices related to water supply, personal hygiene, and sanitation within households. The results obtained will allow for the formulation of targeted and culturally appropriate recommendations to sustainably reduce cholera-related morbidity in this area.

Materials and methods

Study design

Type and location of study: This was a descriptive and analytical cross-sectional quantitative preliminary pilot study with an evaluative aim, conducted in Mombézzélé village, located in the district of Impfondo, department of Likouala in the Republic of Congo. It took place from April 21 to 31, 2026, a period of 10 days.

Population and sampling: The target population consisted of the adult members (aged 18 and over) of the indigenous community residing in Mombézzélé village.

1. Included were adults aged 18 years or older, belonging to the indigenous group of Mombézzélé, residing in the village for at least 6 months, following free and informed consent.

2. Excluded were people with severe symptoms or requiring urgent medical attention (so as not to delay treatment); people under the influence of a state impairing judgment (alcohol, psychogenic substances, etc.); refusal of consent.

The inclusion and exclusion procedure included the identification with the support of the village chief or community leader, verification of inclusion and exclusion criteria, reading of the consent form, and oral validation, taking into account language or literacy barriers.

The sampling method was non-probability convenience sampling. The nomadic or semi-nomadic nature of the fringes of the indigenous population makes exhaustive random sampling difficult.

Variables of interest

1. **Classification of variables:** Sociodemographic variables: Age, sex, education level, profession, household size.
2. **Knowledge variables:** Routes of cholera transmission, symptoms (diarrhea, vomiting, dehydration), methods of prevention (hand washing, boiling water).
3. **Attitude variables:** Risk perception in the face of cholera, traditional beliefs, trust in modern medicine versus traditional medicine.
4. **Variables in practices:** Water supply source, water treatment before consumption, defecation methods, personal and food hygiene practices.

Data collection tools

Data were collected using a standardized KAP (Knowledge, Attitudes, and Practices) survey questionnaire, translated into the local language (Lingala) with the assistance of a translator. The data collection process involved conducting individual, face-to-face, door-to-door interviews, respecting local customs (their daily routines and livelihoods). Data was stored via secure digital entry on a tablet. The raw data were exported daily to an encrypted, password-protected Epi Info database.

Data Analysis

The data were analyzed using SPSS software. Descriptive statistical tests were used to calculate frequencies, means, and standard deviations. The T-score was calculated. Pearson's chi-squared test was used to cross-reference sociodemographic variables with KAP scores. The significance threshold was set at p - value < 0.05.

Ethical considerations

Respect for the principle of protecting vulnerable populations was paramount. The use of an appropriate



informed consent form, translated into the language understood by the participant, was a methodological requirement. Anonymization of participants ensured confidentiality. No personally identifiable information was published. Symptomatic cases identified during the survey were referred to the Mombénzélé Integrated Health Center. This work's free of any conflict of interest.

Results

Univariate analysis (Table 1)

Table 1: Results of the descriptive analysis.

Variables	n	%	$\mu \pm \sigma$
1. Socio demographic informations			
Age range (years)			
20-39	11	44.00	41.28 $\pm$ 10.17
40-59	13	52.00	
60-79	1	4.00	
Sex			
Male	15	60.00	1.4 $\pm$ 0.49
Female	10	40.00	
Education level			
None	23	92.00	1.08 $\pm$ 0.28
Primary	2	8.00	
Secondary	0	0.00	
Superior	0	0.00	
Main activity			
Hunting/Gathering	13	52.00	1.52 $\pm$ 0.57
Agriculture/Fishing	11	44.00	
Craftswoman	1	4.00	
Household size			
< 6 people	5	20.00	11.5 $\pm$ 7.5
> 6 people	20	80.00	
2. Knowledge about Cholera			
Have you ever heard of cholera?			
Yes	2	8.00	4.0 $\pm$ 0.0
No	23	92.00	
How do you think one catches cholera?			
Polluted water	0	0.00	4.0 $\pm$ 0.00
Spoiled/Raw Food	0	0.00	
Dirty hands	0	0.00	
Curse/Sorcerer	25	100.00	
Contact with the patient	0	0.00	
What are the signs of cholera?			
Diarrhea (rice water)	0	0.00	5.0 $\pm$ 0.00
Vomiting	0	0.00	
Intense thirst	0	0.00	
Cramps	0	0.00	
I don't know	25	100.00	
Is cholera fatal?			
Yes	0	0.00	2.24 $\pm$ 0.44
No	19	76.00	
I don't know	6	24.00	
3. Attitudes and Perceptions (Attitudes)			
Do you think you are at risk of catching cholera here?			
Yes	0	0.00	2.00 $\pm$ 0.00
No	25	100	
If you have diarrhea, what do you do first?			
Go to the health center	2	8.00	2.08 $\pm$ 0.49
Drinking herbal teas/traditional medicines	19	76.00	
Wait for it to pass	4	16.00	

How do you react if a neighbor has cholera?			
I avoid all contact	0	0.00	2.00 ± 0.00
I'm going to help him	25	100.00	
I isolate him	0	0.00	
Are you prepared to use chlorinated water for drinking?			
Yes	3	12.00	1.88 ± 0.33
No	22	88.00	
4. Hygiene and WASH Practices			
What is your main source of water?			
River	16	64.00	1.56 ± 0.82
Well	4	16.00	
Rainwater	5	20.00	
How do you treat the water before drinking it?			
Boil	0	0.00	4.00 ± 0.00
Chlorine (Aquatabs)	0	0.00	
Filter with a cloth	0	0.00	
No treatment	25	100	
Where do you defecate most often?			
Latrine/WC	0	0.00	2.56 ± 0.51
In the bush/forest	11	44.00	
In the river	14	56.00	
Do you wash your hands with soap?			
Before eating	0	0.00	3.36 ± 0.49
After the toilet	0	0.00	
No	16	64.00	
Never	9	36.00	
5. Cultural and Social Practices			
In the event of death from diarrhea, what are the funeral practices?			
Body washing by the family	12	48.00	2.08 ± 0.94
Quick burial	1	4.00	
Public ceremony	12	48.00	
Who is the most influential person in making health decisions?			
Traditional chief	7	28.00	1.84 ± 0.62
Traditional healer	15	60.00	
Health worker	3	12.00	

Bivariate analysis

Table 2: Correlation between age and funerary practices.

Age practices funeral	< 40 years	> 40 years	Total	Value X ²	ddl	p - value
Body washing	9	4	13	6.82	2	0.033
Quick burial	0	1	1			
Public ceremony	2	9	11			
Total	11	14	25			

There is a significant correlation between age and funeral practices adopted in the event of death from diarrhea ($p = 0.033$). Younger people (< 40) tend to prefer the body to be washed by the family, while older people (> 40) more frequently opt for a public ceremony.

Table 3: Correlation between sex and willingness to drink treated water.

Awareness Sex	Willingness to drink treated water		Total	Value X ²	ddl	p - value
	Yes	No				
Man	0	15	15	5,114	1	0.0237
Women	3	7	10			
Total	3	22	25			

The p - value of 0.0237 is less than the standard significance level of 0.05; there is a statistically significant relationship between sex and acceptance of treated water consumption. In our series, women were proportionally more likely than men to accept treated water consumption.

**Table 4:** Correlation between education level and main water supply source.

Water source Level	River	Well	Rainwater	Total	Value X ²	ddl	p - value
None	16	2	5	23	11.41	2	0.0033
Primary	0	2	0	2			
Secondary	0	0	0	0			
Superior	0	0	0	0			
Total	16	4	5	25			

The chi-square test indicates a statistically significant relationship between education level and primary source of drinking water ($p = 0.0033$). Individuals with no formal education predominantly consume river water, while the only two individuals with a primary education consume well water.

Table 5: Correlation between main activity and main water supply source.

Treated water Activities	Yes	No	Total	Value X ²	ddl	p - value
Hunting/Gathering	1	12	13	7.65	2	0.0218
Agriculture/Fishing	1	10	11			
Craftsmanship	1	0	1			
Total	3	22	25			

The p - value of 0.0218 is below the classic significance threshold of 0.05. There is, therefore, a statistically significant link between the activity performed and the intention to consume treated water.

Table 6: Correlation between main activity and funeral practices.

Practices Activities	Body washing	Quick burial	Public ceremony	Total	Value X ²	ddl	p - value
Hunting/Gathering	9	0	4	13	26.44	4	0.000026
Agriculture/Fishing	5	0	6	11			
Craftsmanship	0	1	0	1			
Total	14	1	10	25			

The p - value of 0.000026 is well below the standard threshold of 0.05. The choice of funeral practices depends heavily on the activity profile. Those who practiced hunting/gathering predominantly favored having the body lifted by the family. Conversely, those who practiced agriculture/fishing were more evenly divided between having the body washed by the family and holding a public ceremony, with a slight preference for the latter.

Table 7: Correlation between household size and perception of cholera mortality.

Perception Size	Is cholera fatal?		Total	Value X ²	ddl	p - value
	Yes	No				
< 6 people	1	3	4	6.79	1	0.0092
> 6 people	18	3	21			
Total	19	6	25			

The chi-square test revealed a statistically significant association (p - value = 0.0092) between household size and the perception of cholera mortality. Respondents living in small households (< 6 people) tend to answer "I don't know" in a higher proportion than those from large households (> 6 people).

Table 8: Correlation between household size and funeral practices.

Practices Size	Body washing	Quick burial	Public ceremony	Total	Value X ²	ddl	p - value
< 6 people	1	1	2	4	6.19	2	0.045
> 6 people	13	0	8	21			
Total	14	1	10	25			

The standard significance level (0.05) being met, there is a link between household size and the type of funeral. Large households (> 6 people) massively resort to family washing of the body and public ceremonies, completely avoiding a quick burial.

Discussion

Regarding study methodology

The cross-sectional study conducted in Mombézzélé village highlights the structural vulnerabilities of indigenous peoples to cholera, using a convenience sampling methodology adapted to the local semi-nomadic lifestyle. This methodological choice reflects the documented challenges in Africa regarding the chronic deficit in WASH infrastructure, while oral consent meets the ethical requirements of regional anthropological studies.

Although justified by the living conditions of the populations, the convenience selection method induces selection and representativeness biases that limit the scope of the results, while oral consent carries risks of recall bias, social desirability bias, and traceability in data collection.

Regarding the results of the descriptive analysis

About socio-demographic data: The results show that cholera primarily affects adults aged 20 to 59 among the indigenous people of Mombézzélé (96%), with an average age of $41 \pm 10,17$. This concentration among working-age adults is also observed among Bantu populations in other African countries.

In Cameroon and the DRC, epidemic waves hit this age group hard due to their high mobility for economic activities. Work-related travel and the search for resources expose these populations to contaminated water sources [5,6].

Unlike regional urban areas, where children under 5 are often the most vulnerable, this study among indigenous peoples focuses on a working population. This underscores the urgent need for KAP (Knowledge, Attitudes, Practices) awareness campaigns tailored to forestry and agricultural workers in this region.

About age

The KAP study among the indigenous people of Mombézzélé shows a male predominance (60%) among cholera cases. This trend is also observed in other African countries.

In CAR and DRC, men are often more affected due to their professional activities, such as fishing or hunting. These occupations increase their exposure to water sources contaminated by *Vibrio cholerae*. Conversely, women (40%) are generally infected during household chores or caring for the sick [7,8].

About the level of education

The results among the indigenous people of Mombézzélé reveal an alarming illiteracy rate of 92%, with no inhabitant having progressed beyond primary school. This extreme



educational vulnerability surpasses the averages observed among indigenous peoples in Central Africa, particularly in Cameroon and Central African Republic (CAR). This low level of education constitutes a major obstacle to assimilating written cholera prevention messages [9,10].

He explains the persistence of risky behaviors regarding waterborne diseases in this enclave of Likouala. For Africa, this observation underscores the urgent need to adapt future public health interventions in indigenous communities. Programs must prioritize responsive visual or audio communication tools over text-based materials.

About the main activity

Mombéznélé's work reveals a clear predominance of subsistence practices, such as hunting and gathering (52%) and, in a related proportion, agriculture and fishing (44%) among indigenous peoples; a dynamic whose relevance had already been documented by Ndjebet and Bahuchet [11,12].

In Africa, KAP studies on cholera reveal that these subsistence activities highly expose populations to forest areas and untreated water points [13,14].

This strong dependence on direct natural resources exacerbates local epidemiological vulnerability compared to standard norms. Thus, risky behaviors related to gathering and river fishing disproportionately represent the factors of waterborne transmission.

About the size of the household

The results reveal a marked predominance of large households (> 6 people) in Mombéznélé (82.61%), with a high average of 11.5 people. This situation of family overcrowding far exceeds the national and regional averages in Africa, often estimated at between 4.5 and 5.5 individuals per household [15,16].

In the context of cholera epidemiology, this high population density within indigenous communities constitutes a major risk factor. It accelerates human-to-human transmission of *Vibrio cholerae* due to a lack of physical distancing and close proximity. Furthermore, it exacerbates the strain on drinking water resources and the already precarious sanitation infrastructure of Likouala. This demographic configuration explains the increased vulnerability of this community to diarrheal crises compared to the better-equipped urban areas of the sub-region.

About the knowledge of cholera

About the knowledge of cholera: The results of the study among the indigenous people of Mombéznélé reveal a critical lack of awareness, with only 8% of participants having ever heard of cholera. This figure is significantly lower than the averages observed in Africa, particularly in DRC or Cameroon, where knowledge scores about the disease generally exceed 70% in endemic areas [17,18].

This disparity stems from Likouala's severe geographical isolation and the historical socio-educational exclusion of its indigenous peoples. The near-total absence of targeted health campaigns adapted to their culture exacerbates this vulnerability. Given this situation, the implementation of an emergency health education program is essential to prevent any major epidemic risk.

About the mode of cholera transmission

The results show a critical vulnerability, with 100% of the indigenous population of Mombéznélé consuming untreated water. This complete lack of treatment (0% boiling or chlorination) directly exposes this indigenous village to the risk of cholera. In comparison, African KAP studies often reveal limited access to inputs such as chlorine tablets (Aquatabs) [19,20].

However, the use of traditional methods (cloth filtration) remains generally more common there than in Mombéznélé. The geographical and socio-economic isolation of the indigenous peoples of Likouala explains this alarming 100% rate.

Regional data consistently link these deficiencies to recurring waterborne disease outbreaks. It's therefore crucial to contextualize these figures within the specific cultural barriers of this community. These findings underscore the urgent need for targeted awareness campaigns and the free provision of water purification kits.

About the knowledge of the signs of cholera

This KAP study in Mombéznélé reveals a complete lack of awareness (100%) of the signs of cholera among the local population. No respondent mentioned watery diarrhea or vomiting, demonstrating the population's absolute ignorance. This critical knowledge gap increases the risk of local transmission.

In Africa, the level of community awareness is generally higher. Regional KAP studies usually show recognition of signs above 50%. The gap highlights the health isolation of this ethnic minority. There is an urgent need to deploy targeted and adapted education campaigns [4,21,22].

About the prognostic outcome of cholera

None of the participants knew that cholera is fatal. The majority (76.00%) were unaware of this danger, a much higher error rate than the average in Africa. In the subregion, KAP studies generally show better awareness of the fecal-oral hazard, especially in endemic areas [22,23].

This misconception among the indigenous people of Mombéznélé potentially explains their delayed access to healthcare. It also exposes this vulnerable community to an increased risk of mortality during epidemics. Geographic isolation and limited access to education exacerbate this disparity with neighboring countries. Targeted and culturally appropriate awareness campaigns are urgently needed.



About attitudes and perception

About the risk of catching cholera: 100% of the indigenous populations of Mombézzélé believe they have no risk of contracting cholera. This perception of total security contrasts sharply with data from the Central African sub-region. In the neighboring DRC or in Cameroon, KAP studies on epidemics generally show a higher risk awareness among rural populations, often exceeding 60% [18, 24].

The complete lack of awareness of danger among the indigenous peoples of Mombézzélé severely exposes this community to risky behaviors. This collective denial, characteristic of the isolation of the indigenous peoples of Likouala, underscores an alarming deficit in access to information compared to regional standards.

About the first course of action in the face of diarrhea

This study shows that 76% of the indigenous population of Mombézzélé prefers traditional medicine for treating diarrhea. This rate is significantly higher than the African average [25], where initial consultation with health centers is the norm in rural areas. The geographical isolation and cultural barriers of the Likouala region explain this strong reliance on herbal teas.

In comparison, only 8% consult a doctor first, increasing the risk of death from rapid dehydration during a cholera epidemic. This behavior exacerbates the delay in treatment compared to neighboring Bantu populations. It underscores the urgent need to adapt regional awareness programs to the cultural specificities of these communities.

About the reaction to a patient suffering from cholera

The results show absolute community solidarity (100%) in the face of cholera in Mombézzélé, with no respondent choosing isolation or rejection. This strong social cohesion contrasts with data from Bantu populations in Africa, where stigmatization of the sick and fear of contagion often prevail at the beginning of an epidemic [26].

However, this close proximity and direct, unprotected assistance drastically increase the risk of hand-to-hand transmission within the village. It's therefore crucial to integrate these cultural values of mutual aid into local awareness campaigns. This will allow for the teaching of strict preventative measures without disrupting the social fabric of indigenous communities.

About the willingness to use chlorinated water as drinking water

The results show a strong reluctance to use chlorinated water in Mombézzélé (88% refusal). This rejection rate is higher than the average observed among Bantu populations

in some African countries. In these countries, acceptance of chlorination as a means of combating cholera often reaches 40 to 60% after awareness campaigns [27].

Fear of the taste, lack of familiarity, and cultural barriers specific to indigenous populations explain this significant gap. The low acceptance rate (12%, CI: 1.88 ± 0.33) underscores the urgent need for a tailored community-based approach. This score also illustrates the failure of standard hygiene messages among minority groups. Incorporating local perceptions of water is crucial to curbing epidemics.

About hygiene and WASH practices

About the main source of drinking water supply: The strong dependence of the indigenous populations of Mombézzélé on river water (64%) as their main source accentuates their vulnerability to cholera, aligning with regional trends in Africa where the deficit of WASH (water, hygiene, sanitation) infrastructure in rural areas maintains the predominant use of untreated surface water.

Studies conducted in the Congo Basin consistently show that limited access to protected wells (here only 16%) or rainwater (20%) forces marginalized communities to obtain water from river sources highly exposed to fecal contamination upstream [28].

This water insecurity in Mombézzélé underlines that the geographical and socio-economic isolation of indigenous peoples perpetuates supply practices with high epidemiological risk, making targeted water purification interventions essential to break the chain of cholera transmission.

About the method of water treatment before consumption

The results of this KAP study reveal a critical health vulnerability within the indigenous village of Mombézzélé, where 100% of respondents report consuming water without any prior treatment (boiling, chlorine, or filtration).

This complete lack of home water treatment directly exposes this population to cholera epidemics and surpasses the macroeconomic trends observed in Central Africa. Indeed, although access to drinking water remains a major regional challenge in the Congo Basin, demographic and health surveys in the sub-region generally show that a minimal fraction of the rural population resorts to at least artisanal filtration or boiling during times of crisis [29].

The zero score (0%) recorded in Mombézzélé highlights the extreme marginalization of the indigenous peoples of Likouala, their geographic isolation, and their critical lack of access to purification inputs such as chlorine tablets (Aquatabs). This demonstrates that standard public health campaigns fail to reach these isolated communities, necessitating emergency interventions tailored to their way of life.



About the usual place of defecation

These results reflect a complete absence of latrines (0%) among the indigenous population of Mombénzélé in the face of cholera, critically exposing them (44% in the bush, 56% in the river) to fecal-oral contamination. This profile is consistent with data from Africa, where nomadic and riverine communities, such as the Aka pygmies and those of the DRC, suffer from open defecation, which promotes the endemicity of *Vibrio cholerae* [30].

About the use of soap when washing hands

The data from the KAP study in Mombénzélé reveal an alarming health crisis: 100% of the indigenous participants never use soap to wash their hands, whether before eating or after using the toilet (64% responding “no” and 36% “never”).

This 0% compliance score is significantly lower than the averages in Central Africa, where rural handwashing rates with soap, although generally low and often limited by economic barriers or restricted access to clean water, are usually between 10% and 30% according to regional reports from WHO and UNICEF [31,32].

This critical gap accentuates the extreme vulnerability of this community to cholera epidemics, as the total absence of this basic hygienic barrier promotes continuous fecal-oral transmission of the cholera vibrio, exacerbated by the geographical isolation and precariousness of the infrastructure of Likouala.

About some cultural and social practices

About funeral practices following a death from diarrhea: Mombénzélé's results reveal a predominance of family body washing and public ceremonies (48% each), traditional practices that are highly risky for the spread of cholera and align with data from KAP studies conducted in Central Africa, particularly in DRC and Cameroon, where the handling of the deceased during funeral rites is a major vector of community contamination [33,34].

Unlike other areas of the sub-region where the isolation of bodies or rapid, secure burial is sometimes mandated by health authorities, the indigenous communities of Likouala maintain a strong attachment to collective rituals. This strong socio-cultural exposure highlights a vulnerability similar to that of rural Bantu populations in Congo, where the lack of targeted awareness campaigns and safe funeral alternatives undermines efforts to contain cholera epidemics.

About the most influential person in making health decisions

Contrary to the general trend in Africa, where health workers or household heads dominate medical decision-making [35], the results in Mombénzélé reveal a massive

dependence (60%) on the traditional healer. The customary chief influences 28% of the choices, relegating healthcare personnel to only 12%, which reflects a strong cultural entrenchment and geographical isolation characteristic of the indigenous communities of Likouala.

This difference from the classic regional model of Africa underlines the urgency of integrating these traditional healers as essential community relays to ensure the success of awareness and response campaigns against cholera.

Regarding the results of the bivariate analysis

On correlation between age and knowledge of cholera:

The results in Mombénzélé reveal a critical generational divide ($p = 0.033$) where young people perpetuate body washing, a high-risk behavior also documented during cholera epidemics in DRC [33,34].

Unlike older generations who favor public ceremonies, this direct manipulation by those under 40 intensifies community transmission, a major anthropological challenge. This divergence necessitates age-targeted awareness strategies to deconstruct these risky funeral customs and harmonize the response.

On the correlation between sex and the willingness to drink treated water: The statistically significant acceptance of treated water by indigenous women in Mombénzélé ($p = 0.043$) corroborates KAP studies in Africa, where gender strongly determines behaviors towards cholera [36,27].

Similar to the dynamics observed in DRC and CAR, women are positioned as the main actors in water prevention due to their exclusive domestic responsibility in the management of households [37, 38]. Conversely, the majority refusal of men (21/22) highlights a specific male resistance to hygiene messages, exacerbated by the cultural isolation of these populations in Likouala.

This disparity underlines the urgent need to adapt sanitation programs by primarily targeting the engagement of men to curb transmission.

On the correlation between education level and the main source of water supply: In Mombénzélé, the significant correlation ($p = 0.0033$) between lack of education and the use of the river as a water source exposes indigenous peoples to a high risk of cholera, a situation exacerbated by water scarcity in the Likouala region. These results are consistent with certain African studies, where illiteracy and the lack of sustainable infrastructure amplify the health vulnerability of riverside communities [39,40].

The reliance on untreated surface water by poorly educated populations, as observed here, is a key factor in the persistence of the disease in the department. Educational



disparities exacerbate inequalities in access to drinking water, making it urgent to link health initiatives with educational efforts.

On the correlation between the main activity and the main source of water supply: The significant correlation ($p = 0.0218$) in Mombézzélé reveals that hunting/gathering (92% of actors consuming untreated water) dictates access to water resources. This finding corroborates the KAP studies in Central Africa (DRC, Cameroon, CAR), which link the prevalence of cholera to the strong dependence of populations on unprotected surface waters [41,42].

This shared structural vulnerability shows that control programs must absolutely integrate the nomadism and specific lifestyles of these communities in order to succeed.

On the correlation between the main activity and funeral practices: Mombézzélé's results, revealing a critical link ($p = 0.000026$) between hunting/gathering and family washing of bodies, align with data from Africa (Cameroon, Nigeria), where traditional funeral rites significantly amplify cholera transmission [43,44].

Compared with the agricultural Bantu populations of Likouala or the Lake Tanganyika region, who favour public ceremonies regulated by community leaders, the exclusive dependence of hunter-gatherers on intra-family washing accentuates the dynamics of super-spreading [45].

This socio-behavioral divergence demonstrates that Knowledge, Attitudes, and Practices awareness programs in Africa must absolutely abandon uniform approaches in favor of dignified and safe burial protocols, specifically adapted to the lifestyle and unique social structure of each ethnic group.

On the correlation between household size and the perception of cholera mortality: This significant correlation ($p = 0.009$) demonstrates that large households in Mombézzélé have a better perception of cholera lethality, a finding that aligns with KAP studies in Central Africa (DRC, Cameroon) where overcrowding increases risk awareness [46,47].

However, the tendency of small households to ignore this seriousness diverges from global trends, probably due to increased health isolation in Likouala. It's crucial to adapt health education to local community structures in order to harmonize the perception of epidemic risk.

Conclusion

In conclusion, this KAP study reveals a critical vulnerability of the indigenous populations of Mombézzélé to cholera, exacerbated by a lack of access to safe drinking water and basic sanitation, as well as by specific cultural barriers. To sustainably contain this epidemic dynamic, it is imperative to move away from top-down approaches and

fully integrate these communities into the heart of disease control strategies.

Health authorities and humanitarian partners must prioritize the construction of protected water points and the development of community latrines adapted to local lifestyles. Simultaneously, community-based awareness campaigns on handwashing and water disinfection, delivered in local languages, should be intensified.

Finally, strengthening community epidemiological surveillance and ensuring the continued supply of emergency treatment kits to the local health center will guarantee an immediate medical response and effectively interrupt the chain of contamination.

The key recommendations of this work revolve around the co-construction of bilingual (in local languages) awareness programs, the deployment of water purification infrastructures adapted to their nomadic or semi-nomadic lifestyle, and the training of indigenous community relays for active epidemiological surveillance.

Finally, valuing their traditional knowledge by combining it with standard medical protocols will increase the acceptability of care, strengthen local resilience, and guarantee sustainable health equity within the Likouala department.

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