

Original articles

Knowledge, attitudes, and practices of the military population on Mpox, Kokolo Health Zone, Democratic Republic of the Congo, 2025

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Background

Mpox, known before like monkeypox and caused by the Mpox virus, represents an emerging zoonosis of significant magnitude for international public health. There is no publication regarding the preparedness of the military against Mpox in the Kokolo Military Health Zone. The objective of this research was to examine the knowledge, attitudes, and practices (KAP) related to Mpox within the military community in Kinshasa.

Methods

Between April and September 2025, an analytical study was conducted across 27 Health Areas located in the Kokolo Health Zone, which are spread throughout the city of Kinshasa. A structured and approved questionnaire on KoboCollect was used to collect sociodemographic data as well as information on knowledge, attitudes, and practices (KAP) regarding Mpox. We performed descriptive analyses, chi-square tests, as well as logistic regressions. Analysis done with the significant level of 5%;

Results

Among the 1170 respondents, 50.4% demonstrated sufficient knowledge, 45.0% had a positive attitude, and 9.5% showed good practices related to Mpox. Significant gaps in knowledge were observed, including in awareness. Additionally, 25.9% of the military personnel expressed their support for mandatory Mpox vaccination. Discharged military personnel (adjusted odds ratio, aOR = 0.13; 95% confidence interval, CI: 0.003–0.80; p-value = 0.026 and aOR = 0.15; 95% CI: 0.05–0.81; p-value = 0.023), graduates (aOR = 0.05; 95% CI: 0.011–0.44; p-value = 0.004 and aOR = 0.08; 95% CI: 0.012–0.40; p-value = 0.008), state diploma holders (aOR = 0.09; 95% CI: 0.005–0.79; p-value = 0.029 and aOR = 0.10; 95% CI: 0.005–0.84; p-value = 0.029), and those with a primary school certificate or no formal education (aOR = 0.13; 95% CI: 0.06–0.49; p-value = 0.022 and aOR = 0.14; 95% CI: 0.009–0.51; p-value = 0.028) were significantly less likely to exhibit positive attitudes and report good practices related to Mpox compared to those holding a postgraduate degree. The higher-ranking personnel reported positive attitudes.

Conclusions

The research highlights a lack of knowledge, a rather low attitude, and poor habits related to Mpox among military personnel in the Kokolo Health Zone in Kinshasa. The gaps identified underscore the crucial need for specific education and skill development actions to optimize preparedness and response to Mpox.

Since 2022, Mpox has emerged as a major global public health concern, marked by an unprecedented geographic expansion. According to recent World Health Organization (WHO) situation reports, more than 129,000 confirmed cases and over 280 deaths have been recorded across more

than 130 countries between 2022 and 2025.^{1,2} This rapid spread, affecting both historically endemic regions and newly affected areas, led the WHO to maintain Mpox as a Public Health Emergency of International Concern in 2025.¹ While outbreaks in Europe and the Americas have

gradually come under control, sustained transmission continues in several regions, particularly in Africa.

Africa remains the epicenter of the global Mpox burden. WHO data for 2024–2025 indicate that Central and East Africa account for the majority of recent cases, with nearly 20,000 confirmed cases in 2024 and more than 5,000 cases reported in the first quarter of 2025.³ The most affected countries include the Democratic Republic of the Congo (DRC), Uganda, and Burundi, where viral clades I and Ib continue to circulate.^{3,4} These clades are associated with higher transmissibility and a disproportionate impact on children and young adults.⁴ Persistent structural challenges limited diagnostic capacity, uneven epidemiological surveillance, high population mobility, and vulnerability in rural settings further exacerbate the situation.³

Within this continental context, the Democratic Republic of the Congo stands out as the most affected country worldwide. Joint WHO and UNICEF reports published in 2025 document more than 94,000 suspected cases, 18,600 confirmed cases, and over 1,700 deaths during 2024 and early 2025.^{5,6} Transmission has been reported in at least ten provinces, with simultaneous circulation of clades Ia and Ib.^{4,6} The case-fatality rate, estimated at approximately 1.8%, remains concerning, particularly among children under ten years of age.⁶ Despite vaccination efforts over 520,000 individuals vaccinated in 2024 coverage remains insufficient to effectively curb viral spread.⁶

The exceptionally high burden in the DRC reflects a combination of factors, including crowded living conditions, population mobility, limited health infrastructure, and persistent cultural or community practices that facilitate transmission.^{4,6}

Mpox, olderly called monkeypox, is a significant health problem in Africa, particularly in the Democratic Republic of the Congo (DRC). In certain provinces, this disease is endemic and it is among the diseases monitored for their epidemic potential in the DRC. It has experienced an endemic-epidemic progression over the last three years. Every year, the country records nearly 2,800 cases of Mpox, which amounts to about 80% of the total number of cases reported worldwide.⁷

Since July 2022, an outbreak of Clade IIb Mpox has occurred worldwide, resulting in more than 95,000 cases across 115 nations.⁷ According to the Africa CDC, in 2024, 18,737 cases of Mpox, including 541 deaths, were reported in at least twelve African countries. Following the initial cases, occasional outbreaks have been noted in various countries in West and Central Africa, mainly among children living in rural tropical rainforest regions.^{7,8}

In the Democratic Republic of the Congo, apart from the areas of the central basin which generally experience the impact of the disease, it is endemic there. Moreover, Mpox has spread over the past three years to regions that were previously spared. The Democratic Republic of the Congo is now thought to be the epicentre of the Mpox outbreak.⁸ Although Mpox has a high potential for human-to-human transmission, no curative treatment is available. Although a vaccine as a preventive method already exists, it is necessary to encourage individual preventive measures. Thus,

to stop the progression of this disease and reduce morbidity and mortality rates related to Mpox, it is crucial to involve the community in the fight against this pathology, and to adopt best practices.^{9,10} The proper level of knowledge, positive attitudes, and appropriate behaviors regarding Mpox are crucial elements to ensure the success of any public health initiative.^{2,5} Over the past four years, Mpox outbreaks have shown increasing recurrence and have spread to health regions that were previously free of this disease.^{8,11}

Military settings, in particular, represent a high-risk environment due to collective living arrangements, frequent troop movements, and organizational constraints inherent to military operations. The Congolese military personnel is a person in constant motion due to the security situation in the country and in contact with many other people, especially because of his profession and mission.^{8,12}

It was in 1970, in the Basankusu Territory of the Democratic Republic of the Congo (DRC), that human Mpox was first identified in a nine-year-old boy.^{11,13-17} It has been detected in several countries around the world^{14,18} and was declared a global public health emergency by the WHO in July 2022, and then a second time in August 2024.¹⁹ Getting involved in the community means having a good understanding of Mpox, adopting positive behaviors, and following best practices.¹⁵ No KAP study conducted in military settings in Kinshasa has been found.

The objective of this research is to analyze the knowledge, attitudes, and behaviors of militaries regarding Mpox, with the aim of guiding public health initiatives and reducing the mortality rate related to Mpox in Kinshasa in general, and within the Kokolo Health Zone (HZ) specifically.

METHODS

STUDY DESIGN

Cross-sectional study with an analytical aim, conducted from April to September 2025, in the 27 health areas (HAs) of the Kokolo Health Zone, spread throughout the city of Kinshasa. The research was conducted and documented in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.²⁰

CASE DEFINITIONS

- **Knowledge:** a set of data collected by a person concerning a subject, an object, a person, or a group of people.²¹ If the person is aware of the two main signs or symptoms of the disease (fever and vesiculopustular skin rashes), the two modes of transmission, and the two means of prevention, the knowledge is considered sufficient or good.
- **Attitude:** According to Jean-Christophe Tamié,²¹ a lasting internal disposition is responsible for an individual's positive or negative responses to an object or to a class of objects in the social world.

- **Practice:** a method, a behavior, a recurring action of a person in the face of a situation, transmitted or developed in a specific environment.

STUDY PARTICIPANTS

The study population consisted of military personnel who were heads of households, residing in the AS (military camps) of the ZS Kokolo. The inclusion criteria were to be a military member, head of a household, residing in one of the AS (military camps) of the ZS Kokolo, and agreeing to participate in the study. The exclusion criteria were: being absent from the household after two visits, refusing to participate in the study, or being mentally unable to respond to the survey.

SAMPLING

The sample size will be calculated according to the Schwartz formula : $n = d \frac{Z^2 p (1-p)}{i^2}$

Where:

- n= sample size
- d = design effect
- Z = 95% confidence coefficient (1.96) ;
- p = proportion of the population and healthcare providers aware of Mpox
- i = Sampling error margin.

With a cluster effect of 2, a confidence level of 95% (i.e., 1.96) and significant level of 5%, the proportion of military personnel having good knowledge about Mpox at 50%, and a margin of error of 5%, the minimum sample size is 768 people for the entire study area. By estimating a 10% non-response rate, the adjusted minimum sample size became 854 people (military household heads) to be surveyed for the Kokolo study area, but for greater power, we opted to add 35% to the minimum sample size. The selection of subjects was done by simple random sampling using OpenEpi, proportionally to their weight (number of households and military household heads per military camp).

The protocol as well as the survey method, including the technique for selecting samples and administering questionnaires, were generally taught by the principal investigator to the investigators (Registered Nurses of the HA).

The pre-test was conducted in the Police health zone. The team checked the feasibility of the sampling technique and the quality of the questionnaire during the pilot phase. Any shortcomings identified during this pilot phase were taken into account to improve the protocol before its implementation. The questionnaire was administered to the military personnel, as heads of households, during an in-person meeting either at their home or at their workplace, and this was done privately to maintain confidentiality. The data were collected using a digital questionnaire, using KoboCollect, and deployed on the investigators' Android smartphones.

ANALYSIS

The variables of interest for the present study focused on:

- Sociodemographic characteristics of respondents: sex, age, military rank, marital status, profession/secondary occupation;
- Knowledge about Mpox: symptoms and signs, risk factors, modes of transmission, means of prevention;
- Attitudes and practices regarding Mpox: perception of Mpox, behavior change, actions taken or measures implemented concerning Mpox.

The validated data were analyzed with the software Epi Info 7.2.6.0, and the proportions and 95% confidence intervals were calculated. The means as well as their standard deviations were calculated for continuous variables with a normal distribution, while proportions were calculated for categorical variables. The median and its range were calculated for continuous variables with a skewed distribution.

The approval of the National Health Ethics Committee was obtained before the study was implemented under No. 630/CNES/BN/PMMF/2025 dated 16/02/2025. Before being conducted, the study had also received the endorsement of the military and health authorities of the Army to be carried out. Before administering the questionnaire, each participant (military head of household) was freely asked to give their free and informed consent to participate in the survey and to leave it without being in any way disturbed. Each respondent was informed about the objective of the study, their free and voluntary participation in the survey, the confidentiality of the data collected, as well as the potential collective benefits of the study conducted.

RESULTS

A total of 1,170 military household heads were interviewed across all 27 HA of the Kokolo Health Zone scattered throughout the city of Kinshasa, including 80 (6.8%) and 77 (6.6%) respectively in Kokolo1 and Tshatshi ([Table 1](#)).

SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

The data are presented as frequency (percentage). The results were dichotomized as sufficient/low for knowledge, positive/negative for attitudes, and good/bad for practices according to predetermined thresholds. p-values were obtained using the chi-square test of independence; Fisher's exact test was applied when the expected number in the cells was < 5; bold indicates statistical significance set at p-value < 0.05. n = number of respondents. % = percentage. The majority of military household heads were men (n = 879, 75.1%), but sex was not significantly associated with Knowledge (p-value = 0.413), attitudes (p-value = 0.987) and practices (p-value = 0.593). Men and women had similar levels of knowledge, attitudes, and practices regarding Mpox. Most respondents lived in urban areas (n = 819, 70%) but there was no significant association with Knowledge (p-value = 0.715), attitudes (p-value = 0.572) and practices (p-value = 0.471) and living in an urban or rural military health area does not influence Mpox knowledge, attitudes, or practices. Age showed significant associations with attitudes (p-value = 0.041) and practices (p-value = 0.049). Older partici-

Table 1. Distribution of military household heads by Health Area

Health area	Military heads of households n (%)
Kokolo1	80 (6.8)
Tshatshi	77 (6.6)
Kokolo2	73 (6.2)
Ceta	71 (6.1)
Salongo	62 (5.3)
Faé n'djili	57 (4.9)
Force Navale	56 (4.8)
Kibomango	52 (4.4)
Badiadingi	48 (4.1)
Maluku	46 (3.9)
Ndolo	44 (3.8)
Meteo	43 (3.7)
Ci mikondo	41 (3.5)
Gesm	40 (3.4)
Mbaki	38 (3.2)
Loano	36 (3.1)
Bataillon PM	35 (3.0)
Kinkole nsele	34 (2.9)
Base logistique	33 (2.8)
STP Makelele	32 (2.7)
Transmission	30 (2.6)
E-musique	27 (2.3)
Matadi mayo	25 (2.1)
Mabana	24 (2.0)
Anciens combattants	23 (2.0)
Limete motel	22 (1.9)
Bia	21 (1.8)
Total	1,170

pants (55–64 years old and > 64 years old) had more positive attitudes and much better practices compared to younger groups. Younger adults (18–34 years) showed poorer preventive practices, with > 95% classified as “bad practice.” Regarding the military rank category, the majority of head-of-household military personnel (n = 363, 31%) were non-commissioned officers, the rank was significantly associated with knowledge (p-value = 0.038), attitudes (p-value = 0.003) and practices (p-value = 0.044). Higher-ranking officers (Generals and Senior Officers) had better knowledge and showed more positive attitudes and demonstrate better preventive practices. Lower ranks (corporals and soldiers) showed the poorest attitudes (p-value = 0.019) and practices (p-value = 0.007). Higher education levels were linked to more positive attitudes and better preventive practices. Participants with postgraduate education show the best practices (53.3% good practice), while those with primary education show the worst. Marital status showed no significant association with knowledge (p-value = 0.874), at-

titudes (p-value = 0.061) and practices (p-value = 0.093). The complete demographic characteristics are presented in [Table 2](#).

KNOWLEDGE, ATTITUDES, AND PRACTICES OF MILITARY PERSONNEL REGARDING MPOX

Among the survey respondents, 50.4% of military household heads demonstrated insufficient knowledge of Mpox (using Bloom’s threshold of $\leq 59\%$), 45.0% of military household heads showed a positive attitude, and 9.5% of military household heads reported adopting good preventive practices ([Table 2](#)). In addition to the low level of knowledge, significant gaps were observed, among which 71.3% of military household heads were unaware of the modes of Mpox transmission, 63.0% were unaware of the incubation period of Mpox, 77.9% did not know its potential complications, 61.6% were unsure of the existence of an effective vaccine, only 25.9% agreed to mandatory vaccination for all military personnel, and 55.8% could not identify the groups at increased risk of severe disease due to Mpox. 30.2% of military personnel have already secretly and at home treated a Mpox patient with “mayi ya pondu” and/or another traditional treatment, 60.2% of military personnel preferred to take the Mpox patient to a prayer temple (church) or mosque or to a traditional care center or to a care facility that is not a Mpox treatment center. According to 30.6% of military personnel, in its sexually transmitted form, Mpox is either a punishment from God or due to a curse. 70.6% of military personnel condemned the stigmatization faced by Mpox patients, and 28.3% stated that they considered their military chief as a trusted person regarding Mpox, while 20.1% had their religious leader, including traditional practitioners, as a trusted person instead of a health professional. According knowledge, basic awareness is high, but technical knowledge is insufficient. Attitudes were generally positive, but low support for vaccination and isolation, and high stigma. For practices, many respondents do not know how to act when facing a suspected case, indicating poor operational readiness ([Table 3](#)).

FACTORS ASSOCIATED WITH ATTITUDES TOWARD MPOX

Only the age of 18 to 24 years old group remains significant after adjustment (aOR = 0.05; 95% CI: 0.004–0.088; p-value = 0.043). This group is 95% less likely to have good outcomes compared with adults > 64 years***. All other age groups, 25 to 34 years old (aOR = 0.93; 95% CI: 0.09–9.19; p-value = 0.975), 35 to 44 years old (aOR = 1.02; 95% CI: 0.15–5.39; p-value = 0.979), 45 to 54 years old (aOR = 0.94; 95% CI: 0.08–9.17; p-value = 0.971), 55 to 64 years old (aOR = 1.03; 95% CI: 0.17–5.46; p-value = 0.988) lose significance in the multivariate model. Younger military personnel, especially those aged 18–24 years have significantly poorer outcomes (knowledge/attitudes/practices) compared with the oldest group. All education levels below postgraduate remain significantly associated with poorer outcomes, primary or no education (aOR = 0.13; 95% CI: 0.06–0.49; p-value = 0.022), High school diploma (aOR = 0.09; 95% CI: 0.005–0.84; p-value = 0.029), undergraduate diploma (aOR

Table 2. Sociodemographic characteristics of militaries, September 2025

Variable	Total n (%)	Knowledge score n (%)			Attitude score n (%)			Practice score n (%)		
		Sufficient = 590 (50.4)	Weak = 580 (49.6)	p-value	Positive = 527 (45.0)	Negative = 643 (55.0)	p-value	Good = 111 (9.5)	Bad = 1059 (90.5)	p-value
Age										
18–24 years	304 (26.0)	145 (47.7)	159 (52.3)	0.146	125 (43.4)	179 (56.6)	0.041	10 (3.3)	294 (96.7)	0.049
25–34 years	393 (33.6)	195 (49.6)	198 (50.4)		175 (47.6)	218 (52.4)		13 (3.3)	380 (96.7)	
35–44 years	182 (15.6)	96 (52.7)	86 (47.3)		75 (41.2)	107 (58.8)		8 (4.4)	174 (95.6)	
45–54 years	149 (12.7)	76 (51.0)	73 (49.0)		75 (50.3)	74 (49.7)		8 (5.4)	141 (94.6)	
55–64 years	97 (8.3)	52 (53.6)	45 (46.4)		51 (52.6)	46 (47.4)		48 (49.5)	49 (50.5)	
> 64 years	45 (3.8)	26 (57.8)	19 (42.2)		26 (57.8)	19 (42.2)		24 (53.3)	21 (46.7)	
Sex										
Male	879 (75.1)	454 (51.6)	425 (48.4)	0.413	404 (46.0)	475 (54.0)	0.987	53 (6.0)	826 (94.0)	0.593
Female	291 (24.9)	136 (46.7)	155 (53.3)		123 (42.3)	168 (57.7)		58 (19.9)	233 (80.1)	
Types of Health area										
Urban	819 (70.0)	425 (51.9)	394 (48.1)	0.715	402 (49.1)	417 (50.9)	0.572	67 (8.2)	752 (91.8)	0.471
Rural	351 (30.0)	165 (47.0)	186 (53.0)		125 (35.6)	226 (64.4)		44 (12.5)	171 (87.5)	
Level of education										
Without level/primary certificate	374 (32.0)	177 (47.3)	197 (52.7)	0.075	182 (48.7)	192 (51.3)	0.019	20 (5.3)	354 (94.7)	0.007
State diploma or high school diploma	322 (27.5)	156 (48.4)	166 (51.6)		110 (34.2)	212 (65.8)		31 (9.6)	291 (90.4)	
Undergraduate diploma	246 (21.0)	131 (53.3)	115 (46.7)		122 (49.6)	124 (50.4)		23 (9.3)	223 (90.7)	
Bachelor's degree	213 (18.2)	116 (54.5)	97 (45.5)		104 (48.8)	109 (51.2)		29 (13.6)	184 (86.4)	
Postgraduate diploma	15 (1.3)	10 (66.7)	5 (51.4)		9 (60.0)	6 (40.0)		8 (53.3)	7 (46.7)	
Military rank category										
General and senior Officers	149 (12.7)	93 (62.4)	56 (37.6)	0.038	82 (55.0)	67 (45.0)	0.003	76 (51.0)	73 (49.0)	0.044
Junior Officers	321 (27.4)	176 (54.8)	145 (45.2)		157 (48.9)	164 (51.1)		19 (5.9)	302 (94.1)	
Non-Commissioned Officers	363 (31.0)	168 (46.3)	195 (53.7)		168 (46.3)	195 (53.7)		9 (2.5)	354 (97.5)	
Corporals and soldiers	337 (28.8)	153 (45.4)	184 (54.6)		120 (35.6)	217 (64.4)		7 (2.1)	330 (97.9)	
Matrimonial Status										
Single	166 (14.2)	82 (49.4)	84 (50.6)	0.874	59 (35.5)	107 (64.5)	0.061	19 (11.4)	147 (88.6)	0.093
common-law partnership	379 (32.4)	190 (50.1)	189 (49.9)		182 (48.0)	197 (52.0)		28 (7.4)	351 (92.6)	
Married	382 (32.6)	199 (52.1)	183 (47.9)		194 (50.8)	188 (49.2)		32 (8.4)	350 (91.6)	
Divorced	125 (10.7)	61 (48.8)	64 (51.2)		47 (37.6)	78 (62.4)		15 (12.0)	110 (88.0)	
Widower	118 (10.1)	58 (49.2)	60 (50.8)		45 (38.1)	73 (61.9)		17 (14.4)	101 (85.6)	

Table 3. Responses of military personnel to questions about knowledge, attitudes, and practices regarding Mpox in the Kokolo Health Zone, September 2025.

Serial N°	Questions about knowledge on Mpox	Good answers n (%)	Bad answers n (%)
Q1	Have you ever heard of Mpox?	1152 (98.5)	18 (1.5)
Q2	What is the causal agent of Mpox?	640 (54.7)	530 (45.3)
Q3	What are the common modes of transmission of Mpox? (Select all that apply)	587 (50.2)	583 (49.8)
Q4	What are the common symptoms of Mpox? (Select all that apply)	618 (52.8)	552 (47.2)
Q5	Is Mpox a zoonotic disease?	804 (68.7)	366 (31.3)
Q6	What is the incubation period of Mpox?	433 (37.0)	737 (63.0)
Q7	What prevention measures do you know?	620 (53.0)	550 (47.0)
Q8	What is the differential diagnosis of Mpox?	834 (71.3)	336 (28.7)
Q9	Is there an effective vaccine available against Mpox?	449 (38.4)	721 (61.6)
Q10	What are the potential complications of Mpox? (Select all that apply)	259 (22.1)	911 (77.9)
Q11	Is Mpox also transmissible through sexual contact?	488 (41.7)	682 (58.3)
Q12	Which of the following groups is considered to be at high risk for severe complications related to Mpox? (Select all that apply)	517 (44.2)	653 (55.8)
Q13	Is Mpox endemic in certain provinces of the DRC?	611 (52.2)	559 (47.8)
	Questions about attitudes toward Mpox		
Q1	Is Mpox a disease like other diseases or something else?	812 (69.4)	358 (30.6)
Q2	Do you think that Mpox is a serious threat to public health in the Kokolo Health Zone?	1061 (90.7)	109 (9.3)
Q3	To what extent are you concerned about the risk of Mpox in the military community?	989 (84.5)	181 (15.5)
Q4	Do you think the military community should be sufficiently aware of the means of Mpox prevention?	1154 (98.6)	16 (1.4)
Q5	Do you believe that the central office of the Kokolo Health Zone and the military healthcare facilities are sufficiently prepared to handle a Mpox outbreak?	1090 (93.2)	80 (6.8)
Q6	What to do if you catch Mpox?	699 (59.7)	471 (40.3)
Q7	Do you support mandatory vaccination of military personnel against Mpox during this epidemic period?	303 (25.9)	867 (74.1)
Q8	Do you think that people with Mpox should be isolated to prevent the spread of the disease?	507 (43.3)	663 (56.7)
Q9	Are people with Mpox stigmatized by the community?	826 (70.6)	344 (29.4)
Q10	Do you think Mpox can be effectively controlled through public health interventions?	784 (67.0)	386 (33.0)
Q11	Should surveillance and reporting systems for Mpox be strengthened in the Kokolo Health Zone?	1120 (95.7)	50 (4.3)
Q12	Would you like to keep it a secret that you or one of your close ones were getting sick with Mpox?	821 (70.2)	349 (29.8)
	Questions about practices in case of Mpox		
Q1	Have you ever participated in an awareness session about Mpox?	998 (85.3)	172 (14.7)
Q2	How often do you use Mpox prevention measures as well as personal protective equipment (PPE) when you are in front of a patient?	1048 (89.6)	122 (10.4)
Q3	Have you ever encountered a suspected case of Mpox in your community?	707 (60.4)	463 (39.6)
Q4	If you suspect a case of Mpox, what would be your first step?	446 (38.1)	724 (61.9)
Q5	Your trusted person in case of Mpox?	570 (48.7)	600 (51.3)
Q6	How often do you talk about Mpox with your loved ones?	606 (51.8)	564 (49.2)
Q7	Have you ever secretly treated a case of Mpox?	353 (30.2)	817 (69.8)
Q8	What is the best setting for Mpox care where you would take your loved ones?	466 (39.8)	704 (60.2)

= 0.05; 95% CI: 0.011-0.44; p-value = 0.004) and bachelor's degree (aOR = 0.13; 95% CI: 0.003-0.80; p-value = 0.026). Higher rank (General/Senior Officers) is strongly associated with better knowledge, attitudes, and practices compared to lower-ranked personnel like junior officers (aOR = 0.09; 95% CI: 0.009-9.84; p-value = 0.009), non-commissioned officers (aOR = 0.04; 95% CI: 0.006-4.81; p-value = 0.014) and corporals and soldiers (aOR = 0.08; 95% CI: 0.004-21.5; p-value = 0.010).

FACTORS ASSOCIATED WITH PRACTICES TOWARD MPOX

For practices, although some age groups appeared significant in the univariate analysis, none remain significant

in the multivariate model (all p-value > 0.05). Age does not independently predict good outcomes, case of. Age of 18 to 24 years (aOR = 0.50; 95% CI: 0.08-3.65; p-value = 0.539) and all other age groups, 25 to 34 years (aOR = 0.96; 95% CI: 0.11-9.31; p-value = 0.967), 35 to 44 years (aOR = 1.07; 95% CI: 0.15-5.54; p-value = 0.908), 45 to 54 years (aOR = 0.86; 95% CI: 0.09-9.32; p-value = 0.947), 55 to 64 years (aOR = 1.08; 95% CI: 0.16-5.57; p-value = 0.869), were non-significant. Compared with postgraduate-educated personnel, primary/none (aOR = 0.14; 95% CI: 0.009-0.51; p-value = 0.028), high school (aOR = 0.10; 95% CI: 0.005-0.84; p-value = 0.029), undergraduate (aOR = 0.08; 95% CI: 0.012-0.40; p-value = 0.008), bachelor's degree (aOR = 0.15; 95% CI: 0.05-0.81; p-value = 0.023) have

Table 4. Factors associated with attitudes in logistic regression, September 2025.

Variable	Univariate analysis		Multivariate analysis	
	OR (95 % IC)	p-value	aOR (95 % IC)	p-value
Age				
> 64 years	Ref		Ref	
18–24 years	0.03 (0.004 – 0.52)	0.013	0.05 (0.004 – 0.88)	0.043
25–34 years	0.27 (0.05 – 0.90)	0.028	0.93 (0.09 – 9.19)	0.975
35–44 years	0.38 (0.08 – 1.63)	0.204	1.02 (0.15 – 5.39)	0.979
45–54 years	0.26 (0.05 – 0.96)	0.029	0.94 (0.08 – 9.17)	0.971
55–64 years	0.43 (0.06 – 1.68)	0.211	1.03 (0.17 – 5.46)	0.988
Level of education				
Postgraduate diploma	Ref		Ref	
Without level/primary certificate	0.05 (0.004 – 0.37)	0.004	0.13 (0.06 – 0.49)	0.022
State diploma or high school diploma	0.04 (0.001 – 0.53)	0.014	0.09 (0.005 – 0.79)	0.029
Undergraduate diploma	0.03 (0.008 – 0.27)	<0.0001	0.05 (0.011 – 0.44)	0.004
Bachelor's degree	0.05 (0.010 – 0.65)	0.014	0.13 (0.003 – 0.80)	0.026
Military rank category				
General and senior Officers	Ref		Ref	
Junior Officers	0.04 (0.002 – 19.8)	0.045	0.09 (0.009 – 9.84)	0.009
Non-Commissioned Officers	0.02 (0.009 – 12.5)	0.049	0.04 (0.006 – 4.81)	0.014
Corporals and soldiers	0.03 (0.006 – 49.6)	0.009	0.08 (0.004 – 21.5)	0.010

OR = Odds Ratio; aOR = Adjusted Odds Ratio; CI = Confidence interval; Ref = Reference category. Variables with $p < 0.05$ in the multivariate analysis were considered statistically significant.

much lower odds of good knowledge, attitudes, or practices. Rank does not independently predict outcomes once education is accounted for Junior Officers (aOR = 1.08; 95% CI: 0.14–9.78; p -value = 0.971), non-commissioned officers (aOR = 0.52; 95% CI: 0.05–4.83; p -value = 0.521) and corporals/Soldiers (aOR = 1.41; 95% CI: 0.03–22.6; p -value = 0.824). Details in [table 5](#).

DISCUSSION

To our knowledge, this is the first study to examine the knowledge, attitudes, and practices of military personnel regarding Mpox in the Kokolo Health Zone, which is a military health zone encompassing all the military camps in Kinshasa, thus providing a basis for management strategies and evidence-based policy development. This study assessed the knowledge, attitudes, and practices of 1,170 military household heads and identified the key factors influencing their responses to Mpox. This suggests that certain military health areas have higher population density or larger military camps, which may influence exposure patterns, service needs, or disease transmission dynamics. Our results reveal critical gaps in

the preparedness of military household heads in the Kokolo Health Zone, giving us insight even into the city of Kinshasa. 50.4% of respondents demonstrated sufficient knowledge, only 45.0% reported having a positive attitude, and 9.5% reported good preventive practices against Mpox.

The results of our study showed an overall knowledge score of 50.4%, classified as low according to Bloom's cutoff point. Although almost all participants had heard of Mpox, detailed knowledge was moderate to poor across several essential domains. Knowledge of the causal agent, modes of transmission, incubation period, complications, and availability of a vaccine was notably low. These gaps are concerning because they relate directly to the ability to recognize, prevent, and respond to Mpox cases. The low proportion of correct responses regarding sexual transmission and high-risk groups suggests persistent misconceptions, which may hinder early detection and prevention. Similar patterns have been reported in other African settings, where general awareness is high but biomedical understanding remains limited. These findings underscore the need for targeted health literacy interventions, especially for personnel with lower education levels, as highlighted in the regression analysis. You can explore this further with knowledge determinants. While provincial public health officials focus on epidemic prevention and management, success heavily depends on public engagement.^{8,22} Understanding the knowledge, attitudes, and practices of military personnel towards Mpox is essential for developing effective public health interventions, including educational campaigns and community involvement in management, prevention, and care efforts.²² One of the challenges in preventing the reappearance and spread of Mpox is the lack of knowledge in the community, negative attitudes, and poor practices.²³ The level of knowledge was generally insufficient in several communities, such as South Sudan,

Table 5. Factors associated with practices in logistic regression, September 2025.

Variable	Univariate analysis		Multivariate analysis	
	OR (95 % IC)	p-value	aOR (95 % IC)	p-value
Age				
> 64 years	Ref		Ref	
18–24 years	0.41 (0.06 – 0.81)	0.134	0.50 (0.08 – 3.65)	0.539
25–34 years	0.20 (0.05 – 0.91)	0.033	0.96 (0.11 – 9.31)	0.947
35–44 years	0.41 (0.08 – 1.67)	0.216	1.07 (0.15 – 5.54)	0.908
45–54 years	0.22 (0.05 – 0.89)	0.012	0.86 (0.09 – 9.32)	0.947
55–64 years	0.40 (0.09 – 1.69)	0.219	1.08 (0.16 – 5.57)	0.869
Level of education				
Postgraduate diploma	Ref		Ref	
Without level/primary certificate	0.03 (0.004 – 0.38)	0.005	0.14 (0.009 – 0.51)	0.028
State diploma or high school diploma	0.04 (0.003 – 0.57)	0.019	0.10 (0.005 – 0.84)	0.029
Undergraduate diploma	0.04 (0.005 – 0.28)	<0.0001	0.08 (0.012 – 0.40)	0.008
Bachelor's degree	0.05 (0.008 – 0.54)	0.014	0.15 (0.05 – 0.81)	0.023
Military rank category				
General and senior Officers	Ref		Ref	
Junior Officers	2.21 (0.23 – 19.8)	0.449	1.08 (0.14 – 9.78)	0.971
Non-Commissioned Officers	1.34 (0.17 – 12.6)	0.787	0.52 (0.05 – 4.83)	0.521
Corporals and soldiers	5.90 (0.62 – 49.8)	0.105	1.41 (0.03 – 22.6)	0.824

OR = Odds Ratio; aOR = Adjusted Odds Ratio; CI = Confidence interval; Ref = Reference category. Variables with $p < 0.05$ in the multivariate analysis were considered statistically significant.

Ethiopia, Nigeria, Zambia, Lebanon, the United Arab Emirates, Saudi Arabia, Pakistan, Jordan, Italy, Indonesia, and Bangladesh.^{24,25} This state is attributed to the fact that Mpox was nonexistent in Kinshasa, rare in these regions, and is currently reappearing.

Attitudes toward Mpox showed a mix of high concern and contradictory perceptions. Most respondents recognized Mpox as a serious public health threat and supported strengthening surveillance and awareness. However, support for mandatory vaccination and isolation of cases was low, and a large proportion indicated they would keep an Mpox infection secret, reflecting persistent stigma. This contradiction high concern but low acceptance of key preventive measures suggests that fear and misinformation may coexist. Stigma and secrecy can delay reporting, reduce care-seeking, and facilitate silent transmission within military communities. These findings align with evidence from previous outbreaks where stigma undermined control efforts. You can explore this dynamic with attitude mechanisms. Attitudes were generally negative and practices poor for the populations of South Sudan, Ethiopia, Nigeria, Zambia and others countries.^{24,25} In Africa, the epidemics being largely attributed to mysticism explains the fact that the population trusts their religious leader and superior more than a healthcare professional.²⁶

Although many participants reported attending awareness sessions and using personal protective equipment (PPE), practical response capacity was weak. Most respondents did not know the correct first step when encountering a suspected case, nor the appropriate care setting or report-

ing pathway. This disconnect between awareness and action suggests that training may be theoretical rather than operational, lacking practical drills or scenario-based learning. The high proportion of respondents who had encountered suspected cases but did not follow recommended procedures highlights a critical gap in outbreak response readiness.

This is particularly concerning in military environments, where close living conditions and

mobility can accelerate transmission. You can explore this further with practice determinants. The vulnerability of the soldier is exacerbated by the practice of his profession.¹² Sometimes isolated from the rest of the population during operations, the Congolese soldier can easily engage in hunting and gathering, which is nevertheless dangerous in the case of viral diseases such as Ebola virus disease, Mpox, etc., whereas in peacetime, he approaches the civilian population, without sufficiently protecting himself and exposing himself to all contagious diseases. The Kokolo Military Zone is poorly positioned to be spared from epidemics in Kinshasa, due to its situation with military camps scattered throughout the city of Kinshasa.⁸

This study showed that the participants were also concerned about the Mpox outbreak. This finding could become a lever to work on in order to gain their commitment to the management of Mpox cases. Even though insufficient knowledge can lead to interruptions in detection and response, contributing to the spread of the disease. Our results also showed that the level of education and military rank are significant predictors of better attitudes. Indeed,

general, senior, and junior officers, who are generally more educated and exposed to scientific curiosity to better understand Mpox and other diseases, often have a higher level of knowledge compared to non-commissioned officers, corporals, and soldiers who were less exposed to true and accurate information from television, radio, inter-unit correspondence, and scientific journals. This result may perhaps deserve a thorough investigation. However, launching awareness campaigns among the general military population seems necessary. In addition, launching awareness campaigns among the general population is inevitable to prevent or control potential epidemics in the future.²⁷ Most participants in the present study were aware of the possibility of human-to-human transmission of the virus. However, the majority of participants were not fully informed about the modes of disease transmission, its symptoms, and its complications. A similar finding was obtained from studies conducted in developing countries.²⁸ The present study, in accordance with previous studies,²⁹ showed that participants were somewhat familiar with the skin symptoms of Mpox. This may be due to a visual learning approach through watching television and other social media. According to the relationship between general knowledge about Mpox and the sociodemographic data of the participants, people with a higher level of education had higher knowledge scores. This result was predictable, as these individuals are expected to have reliable access to information, engage in reading scientific publications, and possess the skills to evaluate information sources and make informed decisions about their quality. Similar results were obtained in a recent survey conducted in Middle Eastern countries, where education level and age were factors influencing awareness of Mpox.³⁰ It is necessary to raise awareness among military personnel of all ranks about the potential risks associated with social media addiction, mentioned by more than 30% of soldiers as their primary source of health information, and to encourage the use of reliable sources of information such as healthcare professionals and the official website of the Ministry of Public Health, Hygiene, and Social Welfare. Indeed, implementing public health interventions and measures without the encouragement and cooperation of the population will not achieve the expected effectiveness. The results of this study have significant implications for public health interventions aimed at improving awareness and preparedness for emerging infectious diseases such as mpox.³⁰

Our survey revealed that 52.8% of respondents were aware of the early signs and symptoms of Mpox. In suspected cases of Mpox, 43.3% of military personnel indicated that they would quickly isolate the patient and report the case to the competent health authorities in accordance with established guidelines. These results highlight a low level of awareness and adherence to Mpox prevention practices among military personnel. Our study revealed an overall extremely low level of preventive practices against Mpox at 9.5%. This is lower than the 51.8% reported in Vietnam.³¹

According to our study, 25.9% of military personnel expressed their willingness or support for mandatory vaccina-

tion against Mpox, a rate lower than the 58% estimated by the WHO³² and the 58.6% acceptance rate documented by Ricco et al. (2022) in Italy.³³ These variations may reflect differences in the populations studied, regional vaccination policies, or levels of awareness about Mpox at the time of data collection.

In the multivariate logistic regression analysis, the level of education and the military rank category were significant predictors of attitudes, and only the level of education was a significant predictor of practices related to Mpox among the military. Enlisted personnel, graduates, state diploma holders, and those with a primary school certificate or no formal education were significantly less likely to report positive attitudes and good practices related to Mpox compared to those with postgraduate degrees. This means differences seen earlier were likely due to confounding factors, especially education and rank. Corporals and soldiers, non-commissioned officers, and junior officers were significantly less likely to report good practices related to Mpox compared to general and senior officers. This may be due to access to accurate and correct information and the critical sense of each military group, but also to a lack of community awareness and can suggest that the earlier association between rank and KAP was driven by differences in education levels across ranks, not by rank itself. The regression analysis demonstrated that education level is the strongest and only independent predictor of good KAP outcomes. Participants with lower education levels had dramatically reduced odds of good knowledge, attitudes, and practices compared with those holding postgraduate qualifications. Age and military rank, although significant in univariate analysis, lost significance after adjustment, indicating that their effects were confounded by education. This means that differences previously attributed to age or rank were actually driven by underlying disparities in educational attainment.

This finding reinforces the central role of health literacy in shaping disease-related behaviors. It also suggests that interventions should prioritize personnel with lower education levels, regardless of age or rank. You can explore this with education effects.

STRENGTHS AND LIMITATIONS

Firstly, reliance on self-reported data may have introduced social desirability and recall biases. Secondly, the study was conducted only in Kokolo Military Health Zone, whereas military personnel are present in all 6 Military Health Zones of the Democratic Republic of Congo. Thirdly, the qualitative aspect of the study was not addressed with focus groups, small targeted group discussions, and in-depth interviews between respondents. Despite these limitations, the study presents several notable strengths. To our knowledge, this is the first study in a military Health Zone, in Kinshasa, to evaluate the knowledge, attitudes, and practices of military personnel regarding Mpox. The use of a structured questionnaire on KoboCollect enhanced confidentiality, reliability, and the diverse zonal coverage of participants, contributing to the generalization of the results within the military community of Kinshasa. The study

highlights significant gaps in epidemic preparedness, emphasizing the urgent need for coordinated action by the Ministry of Health and the province. To strengthen the resilience of the health system, we propose priority interventions: including investment in health education, surveillance systems, and the development of reactive and proactive policies. Such measures are essential to ensure that the military is adequately informed to respond to the epidemic and mitigate the impact of future epidemics such as Mpox.

CONCLUSIONS

We assessed the knowledge, attitudes, and practices related to Mpox among the military personnel of Kokolo HZ in Kinshasa, identifying the main gaps in awareness and behavior. The results revealed a low level of knowledge, weak positive attitude, and poor practices toward Mpox. This information is important to guide targeted education and training programs aimed at improving Mpox preparedness and response among the military. By addressing the identified gaps, Kokolo HZ, and even the entire city of Kinshasa, can strengthen its capacity to prevent, detect, and mitigate the spread and impact of Mpox, particularly in the face of emerging global health threats. This study provides fundamental evidence to support policy development, resource allocation, and capacity-building initiatives to strengthen epidemic preparedness and public health resilience in Kokolo HZ.

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AUTHORS' CONTRIBUTIONS

- MASAMBA BIKOKI Winnie: design, analysis, and writing.
- KIULA NTETE Eloi: analysis, and writing.
- NDUMBI TEMUANGUDI Vallhy: design, analysis, and writing.
- AMISI KENGEA Levis: corresponding author, design, literature review, data availability, analyses, writing of the report and the article.

COMPETING INTERESTS

The authors declare no competing interests.

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