



Research Article

Sepsis in the Intensive Care Units in the Republic of Congo in 2024: Epidemiological Aspects and Factors Associated with Death

Elombila Marie^{1, 2, *} , **Mpoy Emy Monkessa Christ Mayick^{1, 2}** , **Nakavoua Zozer²**, **Niengo Outsouta Gilles^{1, 2}**, **Bayoundoula Ghislaine¹**, **Nde Ngala Marina Aurolé¹**, **Iwoba Rebet Sarrah Armanda¹**, **Kibamba Nieme Isaac¹**, **Boyewi Jeancia¹**, **Koumou Regis¹**, **Otiobanda Gilbert Fabrice^{1, 2}**

¹Polyvalent Intensive Care Unit, University Hospital of Brazzaville, Brazzaville, Republic of Congo

²Faculty of Health Sciences, Marien Ngouabi University, Brazzaville, Republic of Congo

Abstract

Sepsis is a major public health problem in the world, especially with the emergence of multi-resistant bacteria. The frequency of admission of septic patients to intensive care is gradually increasing. In Africa, few data are available on sepsis, and the factors associated with sepsis mortality remain unclear. The aim was to analyze the epidemiological profile and factors associated with sepsis mortality in intensive care units (ICUs) in the Republic of Congo. This was a prospective, multicenter, longitudinal cohort study covering the period from March 1 to August 31, 2024. It took place in four ICUs in the Republic of Congo. We included patients admitted for sepsis ICUs of the centers selected for the study, aged at least 18 years, presenting at least two elements of SIRS and/or a qSOFA ≥ 2 , associated with a presumptive or confirmed infection. Study variables were: sociodemographic, clinical, paraclinical, SOFA score, therapeutic and outcomes. Data analysis was performed using IBM-SPSS version 20 software. Quantitative variables were expressed as mean with standard deviation, and qualitative variables as numbers with frequencies. We performed two types of analysis: a univariate analysis and a multivariate analysis to identify factors associated with mortality. A total of 156 patients were registered, representing a frequency of 17.8%. The median age was 45 years, with a sex ratio of 1.02. The majority of patients (64%) had comorbidities dominated by high blood pressure and diabetes mellitus. The main reasons for admission were impaired consciousness (57.7%) and hemodynamic instability (40.4%). The most common sites were digestive and neuromeningeal in 30.1% respectively. Patients had a GCS between 9 -12 (39.1%), arterial hypotension (41%), $\text{SpO}_2 \leq 92\%$ (25.6%) and diuresis < 0.5 ml/kg/h (48.1%). Patients had a SOFA score (7-14) in 62.8%. The two most frequent organ failures were neurological (63.5%) and renal (57.7%). Double antibiotherapy was used in the majority of cases (47.9%). We recorded a mortality rate of 33.3%. Median length of stay was 3 days [range: 2-7 days]. Factors associated with mortality were altered consciousness (ORa: 2.82; adjusted p = 0.008), surgical treatment (ORa: 3.57; adjusted p = 0.032), mechanical ventilation as therapeutic means (ORa: 2.15; adjusted p = 0.006), SOFA score 11-14 (ORa: 2.68; p = 0.002) and organ failure (ORa: 0.08; adjusted p = 0.043). Sepsis is common in ICUs in the Republic of Congo. The profile is that of a young adult, presenting with a severe infection of digestive or neuromeningeal origin with neurological or renal failure. Mortality is high.

*Correspondence: Elombila Marie (elombila@gmail.com)

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Keywords

Sepsis, Epidemiology, Associated Factors, Mortality, Intensive Care, Congo

1. Introduction

Sepsis represents a major global public health challenge, particularly given the emergence of multi-resistant bacteria (MRB) [1, 2]. Until 2015, the term referred to any generalized inflammatory response associated with a severe infection [3]. Since then, sepsis has been defined - according to Sepsis-3 criteria - as life-threatening organ dysfunction resulting from a dysregulated host response to infection [1, 2]. It remains a leading cause of intensive care unit (ICU) admissions and deaths worldwide, despite diagnostic and therapeutic advances made in recent decades [2]. According to the World Health Organization (WHO) and Global Burden of Disease estimates, sepsis affects 48.9 million people annually and causes 13.5 million deaths worldwide each year [4, 5]. It affects both developed and resource-limited countries, with sub-Saharan Africa and Southeast Asia being the most heavily impacted regions [4, 5]. In the United States, the incidence of sepsis is estimated at 300 cases per 100,000 inhabitants; it is the leading cause of in-hospital mortality, resulting in nearly 350,000 adult deaths annually [4, 5]. In Europe, up to 135,000 sepsis-related deaths have been recorded each year [5]. Limited data on sepsis are available for Africa [6]. With nearly 17 million cases and 4 million sepsis-related deaths, sub-Saharan Africa records the highest in-hospital and ICU mortality rates (47.2%) among septic patients [4, 6]. Recent studies have identified several factors associated with death: advanced age, septic shock, multiple organ failure, mechanical ventilation, the use of vasopressors, and high severity scores [7].

Data from Central Africa remain scarce. A recent study in the Democratic Republic of Congo (DRC) highlighted the roles of septic shock, multiple organ failure, and mechanical ventilation in deaths occurring in ICUs [8]. In the Republic of Congo, Niengo *et al.* reported a prevalence of 20.7% in the polyvalent ICU of the Brazzaville University Hospital (BUH) [10]. However, there have been no nationwide studies on factors associated with death from sepsis in ICUs - despite sepsis being a leading reason for admission - which prompted the implementation of our research study. The primary objective was to analyze the epidemiological profile and factors associated with mortality from sepsis in ICUs in the Republic of Congo.

2. Patients and Methods

The study on sepsis in the Republic of Congo was designed and planned by the research team from the ICU of the BUH,

and received ethics committee approval. Administrative authorizations were obtained to conduct the study. This was a prospective, observational, longitudinal, multicenter study conducted over a six-month period, from March 1 to August 31, 2024. The study took place in four ICUs in the Republic of Congo: three in Brazzaville - specifically the Brazzaville University Hospital (BUH), the Talangai Referral Hospital (TRH), and the Djiri General Hospital (DGH) - and one in Pointe-Noire, the Adolph Sice General Hospital (ASGH). The source population consisted of patients admitted for sepsis to the four aforementioned ICUs. We included patients aged 18 years or older who presented with at least two criteria for Systemic Inflammatory Response Syndrome (SIRS) and/or a quick Sequential Organ Failure Assessment (qSOFA) score ≥ 2 , associated with a suspected or confirmed infection, and who provided informed consent. Patients who died within twenty-four hours of admission were excluded. Sampling was consecutive and exhaustive. The calculated minimum sample size was 252 patients. Data were collected from ICU admission registers, written medical records, laboratory reports, and prescription and monitoring charts. A dedicated data collection form was designed for this purpose. The study variables included sociodemographic, clinical, paraclinical, SOFA score, therapeutic, and outcome-related data. Data were entered using Excel 2013 software, and analysis was performed using IBM-SPSS software (version 20). Quantitative variables were expressed as mean $\pm$ standard deviation or median [quartiles], while qualitative variables were expressed as counts and percentages (%). Two analyses were conducted: first, a univariate analysis using Fisher's exact test to compare frequencies and Student's t-test to compare means (results were considered significant at $p < 0.05$); second, a multivariate analysis involving binary logistic regression of all variables with a p -value < 0.09 in the univariate analysis, in order to identify factors correlated with mortality. The SOFA score was used to identify organ failure in septic patients in ICU and to determine sepsis severity. In the absence of blood gas analysis in ICUs, respiratory failure was defined by an $\text{SpO}_2/\text{FiO}_2$ ratio < 357 mmHg.

3. Results

During the study period, 873 patients were admitted to ICUs, 182 of whom were admitted for sepsis (20.8%). After applying the selection criteria, 26 patients were excluded from

the study. Thus, a total of 156 patients were included, representing a frequency of 17.8% (Figure 1). The median age was 45 years [Q1=29; Q3=45], with a range of 18 to 85 years. The 25-44 age group was the most represented (33.3%). The sex ratio was 1.02. In 68% of cases, patients were married or in a common-law partnership. Patients had secondary or higher education levels in 39.1% of cases, respectively, and 44.2% had no income. Table 1 shows the distribution of patients according to sociodemographic data. Comorbidities were present in 64% of cases, predominantly high blood pressure (21.2%) and diabetes mellitus (17.3%). The main reasons for admission were impaired consciousness (57.7%), hemodynamic instability (40.4%), and respiratory distress (26.3%). In our study, the suspected and/or confirmed sources of infection associated with sepsis were gastrointestinal (30.1%), neurological (16.7%), and pulmonary (16.7%). Table 2 shows the distribution of patients according to comorbidities, reason for admission, and suspected and/or confirmed sources of infection.

Regarding paraclinical findings, complete blood count abnormalities were dominated by leukocytosis (77.6%), anemia (51.3% - severe in 16% of cases), and thrombocytopenia (32.1%). The median C-reactive protein (CRP) level was 88 mg/L, with elevated levels observed in 94.4% of patients. Procalcitonin (PCT) testing was performed in only 8.8% of cases; of these, 87.5% showed abnormal levels (>0.5 $\mu\text{g/L}$). Renal function was abnormal in 54.4% of patients, with a median serum creatinine level of 105 $\mu\text{mol/L}$; the glomerular filtration rate (GFR) was impaired in 77.6% of cases. An etiological workup for infection was conducted for 44.1% of patients; the most frequently performed tests were thick blood smears for hematozoa, urine culture, blood culture, and pus culture. Only 16.7% of patients underwent imaging studies, comprising plain radiography (10.1%), ultrasound (4.4%), and computed tomography (2.2%). Table 3 presents the distribution of patients based on paraclinical data. The SOFA severity score was assessed for all patients, yielding a mean of 8.5 ± 3.7 and a range of 0 to 20. In our study, 98.7% of patients had a SOFA score ≥ 2 . A SOFA score between 7 and 14 was observed in 62.8% of patients. Figure 2 illustrates the distribution of patients according to their SOFA score.

All patients received initial empiric antibiotic therapy combining two (47.8%) or three (42.2%) agents. The most frequently used agents were third-generation cephalosporins (84%), imidazoles (81.4%), and aminoglycosides (26.9%). All patients in our study underwent fluid resuscitation. A central venous catheter (CVC) was inserted in 10.2% of cases. Other therapeutic measures included oxygen therapy (75%), tracheal intubation with mechanical ventilation (64.1%), the

use of vasoactive drugs (55.1%), blood transfusion (52.6%), and corticosteroid therapy with hydrocortisone (28.8%). Surgical management was required in 26.5% of cases, primarily consisting of exploratory laparotomy to eliminate the source of infection.

In our study, the most common organ failures were neurological (63.5%), renal (57.7%), hepatic (44.2%), respiratory (41.7%), hemodynamic (25%), and hematological (16.7%). We recorded a mortality rate of 33.3% due to multiple organ failure. The median length of stay was 3 [2-7] days. Following univariate analysis, the following variables were statistically associated with a high risk of death: impaired consciousness at admission (OR: 2.79; $p = 0.005$), arterial hypotension (OR: 2.16; $p = 0.000$), oliguria (OR: 1.85; $p = 0.016$), surgical treatment (OR: 3.53; $p = 0.011$), mechanical ventilation (OR: 2.15; $p = 0.001$), presence of organ failure (OR: 0.05; $p = 0.002$) - particularly multi-organ failure (OR: 2.16; $p = 0.000$) - and a SOFA score between 11 and 14 (OR: 2.51; $p = 0.001$). Table 4 presents the univariate analysis of factors associated with death. Binary logistic regression revealed that impaired consciousness (aOR: 2.82; adjusted $p = 0.008$), surgical treatment (aOR: 3.57; adjusted $p = 0.032$), mechanical ventilation (aOR: 2.15; adjusted $p = 0.006$), a SOFA score between 11 and 14 (aOR: 2.68; $p = 0.002$), and organ failure (aOR: 0.08; adjusted $p = 0.043$) were independent factors associated with death (Table 5).

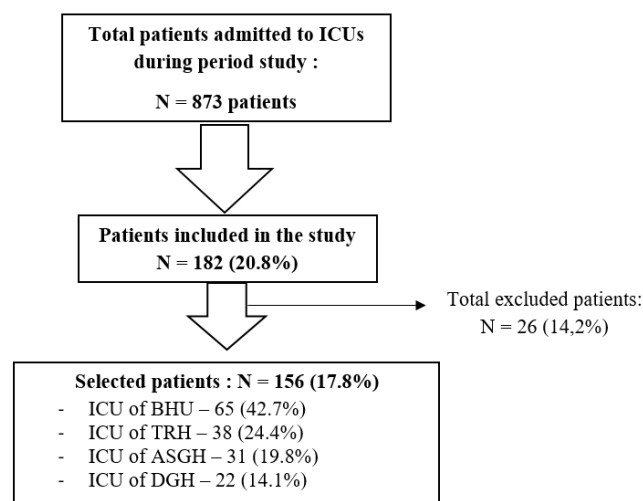


Figure 1. Flow chart of study population.

ICU: Intensive care unit

BUH: Brazzaville University Hospital; ASGH: Adolph Sice General Hospital

TRH: Talanga iReferral Hospital; DGH; Djiri General Hospital

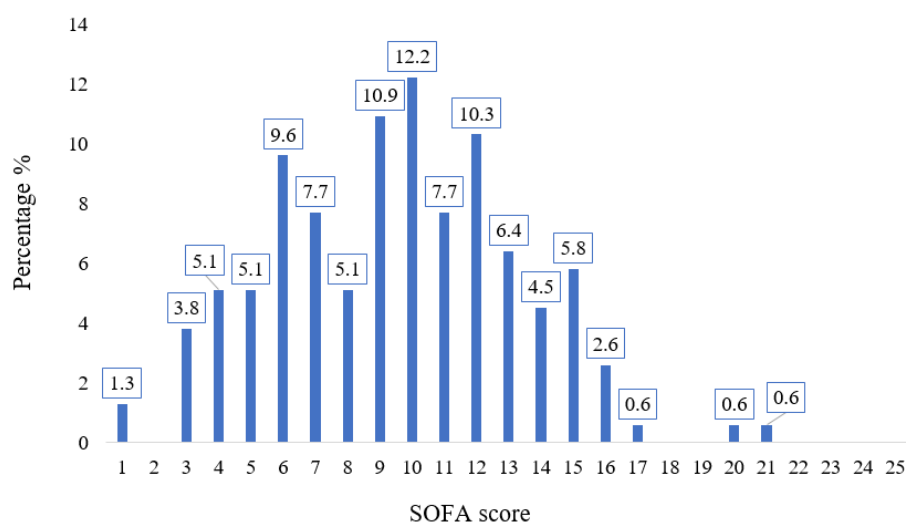


Figure 2. Distribution of patients according to their SOFA score.

Table 1. Sociodemographic data of patients admitted for sepsis to ICUs in Congo.

	Effective (N=156)	Percentage (%)
Sex		
Male	79	50.6
Female	77	49.4
Age group (years)		
18-24	34	21.8
25-44	52	33.3
45-65	37	23.7
> 65	33	21.2
Marital status		
Unmarried partner	77	49.4
Single	40	25.6
Married	29	18.6
Widowed	09	5.8
Divorced	01	0.6
Level of education		
None	04	2.6
Primary	61	39.1
Secondary	61	39.1
Higher education	30	19.2
Occupation		
Unemployed/Homemaker	41	26.2
Informal sector worker	36	23.1
Pupil/Student	28	18.0
Retiree	22	14.1

	Effective (N=156)	Percentage (%)
Private sector employee	16	10.3
Public sector employee	11	7.1
Law enforcement	02	1.2

Table 2. Distribution of patients according to comorbidities, reason for admission, and suspected and/or documented sites of infection.

	Effective (N)	Percentage (%)
Comorbidities (N=156)		
No comorbidity	56	36.0
High Blood Pressure	33	21.2
Diabetes mellitus	27	17.3
HIV	13	8.3
Sickle cell disease	10	6.4
Kidney failure	05	3.2
Cancer	04	2.6
Asthma	03	1.9
Pulmonary tuberculosis	03	1.9
Viral hepatitis	01	0.6
Pregnancy	01	0.6
Reasons for admission (N=156)		
Impaired consciousness	90	57.7
Hemodynamic instability	63	40.4
Respiratory distress	41	26.3
Postoperative care	33	21.2
Seizures	24	15.4
Severe trauma brain injury	09	5.8
Thermal burn	02	1.3
Cardiac arrhythmia	01	0.6
Suspected and/or documented sites of infection (N=167)		
Digestive	47	30.1
Nervous system	47	30.1
Not found	23	14.7
Pulmonary	23	14.7
Gynecological	12	7.7
Cutaneous	08	5.1
Urinary	05	3.2
Musculoskeletal	02	1.3

Table 3. Distribution of patients according to paraclinical data.

	Effective (N=156)	Percentage (%)
Complete blood count		
Leukocytosis	121	77.6
Anemia	80	51.3
Thrombocytopenia	50	32.1
Leukopenia	5	3.2
Liver fonction		
AST > 2x ULN	38	24.4
ALT > 2x ULN	34	21.8
Renal function		
Abnormal serum creatinine	85	54.5
Abnormal GFR	121	77.6
Etiological infectious		
Thick blood smear for malaria parasites	22	14.1
Urine culture	15	9.6
Blood culture	9	5.8
Pus culture	8	5.1
Cerebrospinal fluid analysis	6	3.8
Pleural fluid analysis	5	3.2
Search for Acid-alcohol-fast bacillus	2	1.3
Stool culture	1	0.6
Ascitic fluid analysis	1	0.6
Imaging assessment		
None	130	83.3
Standard X-ray	16	10.2
Ultrasound	7	4.9
Computed tomography scan	4	2.6

ASAT: aspartate transferase; ALAT: alanine transferase; ULN: upper limite of normale; GFR: Glomerular filtration rate;

Table 4. Univariate analysis of factors associated with death during sepsis.

Variable	Death N=52; n (%)	Survival N=104; n (%)	OR (95% CI)	Value p
Age groups (years)				
18-24	15 (44.1)	19 (55.9)	1	
25-44	16 (30.8)	36 (69.2)	0.920	2.940
45-64	11 (29.7)	26 (70.3)	0.810	2.702

Variable	Death N=52; n (%)	Survival N=104; n (%)	OR (95% CI)	Value p
≥ 65	10 (30.3)	23 (69.7)	0.853	3.005
Sex				
Male	30 (38.0)	49 (62.0)	1.03 (0.43-2.46)	0.561
Comorbidities				
High blood pression	10 (30.3)	19 (69.7)	0.43 (0.12-1.50)	0.189
Diabetes mellitus	8 (29.6)	19 (70.4)	1.33 (0.85-2.21)	0.255
Reason for admission				
Impaired consciousness	62 (59.6)	28 (53.8)	1.17 (0.79-1.74)	0.422
Hemodynamic instability	42 (40.4)	21 (40.4)	0.87 (0.58-1.30)	0.513
Respiraty distress	28 (26.9)	13 (25.0)	1.16 (0.75-1.80)	0.498
Clinique presentation				
Altered consciousness (GCS<15)	28 (31.1)	62 (68.9)	2.79 (1.36-5.72)	0.005
Hypotension	7 (10.9)	57 (89.1)	2.19 (1.44-3.33)	0.000
Urine output < 0,5 ml/kg/h	73 (97.3)	2 (2.7)	1.85 (1.12-3.05)	0.016
Management				
Surgery	22 (52.2)	20 (47.8)	3.53 (1.32-9.48)	0.011
Oxygen therapy	32 (23.7)	85 (76.3)	1.32 (0.79-2.18)	0.279
Mechanical Ventilation	19 (19.0)	81 (81.0)	2.15 (1.34-3.44)	0.001
Blood transfusion	31 (43.8)	51 (56.3)	1.62 (0.53-4.87)	0.279
Vasoactive drugs infusions	10 (31.3)	22 (68.7)	0.85 (0.57-1.25)	0.419
Corticosteroid therapy	12 (26.7)	33 (73.3)	1.07 (0.70-1.63)	0.737
Outcomes				
Organ failure	41 (28.9)	101 (71.1)	0.05 (0.01-0.50)	0.002
SOFA score				
0-6	22 (43.1)	29 (56.9)	1	
7-10	36 (64.3)	20 (35.7)	1.40 (0.82-2.40)	0.212
11-14	41 (97.6)	1 (2.4)	2.51 (1.48-4.25)	0.001
15-24	5 (71.4)	2 (28.6)	1.44 (0.54-3.83)	0.464
Type of organ failure				
Neurological	29 (29.3)	70 (70.7)	1.47 (0.97-2.22)	0.067
Pulmonary	13 (20.0)	52 (80.0)	1.47 (1.00-2.17)	0.050
Renal	18 (20.0)	72 (80.0)	1.60 (1.05-2.45)	0.028
Hepatic	17 (24.6)	52 (75.4)	1.40 (0.95-2.07)	0.084
Multivisceral	6 (11.5)	46 (88.5)	2.16 (1.45-3.21)	0.000

Table 5. Independent factors associated with death during sepsis.

Variable	Death N=52; n (%)	Survival N=104; n (%)	aOR (95% CI)	Value <i>adjusted p</i>
State of consciousness				
Altered consciousness	28 (31.1)	62 (68.9)	2.82 (1.46-6.23)	0,008
SOFA score				
11-14	41 (97.6)	1 (2.4)	2.82 (1.73-4.11)	0,002
Surgical management				
Yes	22 (52.2)	20 (47.8)	3.57 (1.11-11.46)	0,032
Mechanical Ventilation				
Yes	19 (19.0)	81 (81.0)	2.15 (1.34-3.44)	0,006
Organ failure				
Yes	41 (28.9)	101 (71.1)	0.08 (0.01-0.92)	0,043

4. Discussion

This study has certain limitations that must be considered for a better analysis and interpretation of our results. The target sample size was not achieved due to a decline in hospital attendance linked to the socio-economic problems the country was experiencing during the study period. The majority of patients did not undergo bacteriological sampling due to the high cost of additional tests and their unavailability at night. In the absence of effective universal health insurance, the cost of prescriptions and additional tests is borne by the patients and their families. This prevented us from identifying the pathogens responsible for sepsis ICUs in the Republic of Congo. Several ICUs across Africa face similar realities [10]. Despite these limitations, our results can be interpreted and are representative of the overall situation in the country.

During the study period, the frequency of sepsis in ICUs in the Republic of Congo was 17.8%. Our result is comparable to that reported by Guilba *et al.* in Burkina Faso, who found a frequency of 14.8% [11]. It is close to the rate reported by Niengo *et al.* (20.7%) in their study on sepsis and septic shock in the polyvalent ICU of the BUH [9]. Furthermore, in the same unit in 2017, Otiobanda *et al.* reported that sepsis and septic shock were the most frequent reasons for admission, accounting for 15.7% of cases [12]. In sub-Saharan Africa, a review and meta-analysis reported an overall prevalence of 17% for patients admitted with sepsis, rising to 31% in ICUs [13]. These observations support the hypothesis that admissions for sepsis are steadily increasing in ICUs [14].

In our study, we recorded a median age of 45 years, with a range of 18 to 85 years. These results are comparable to those reported by Niengo *et al.* (43.1 ± 17.9 years) in Republic of

Congo and Sama *et al.* (43 ± 32 years) in Togo [9, 15]. Guilba *et al.* in Burkina Faso and Mulatu *et al.* in Ethiopia reported mean ages of 41 and 40 years, respectively [11, 16]. The young adult population observed in our series reflects the sub-Saharan African population in general, and the Congolese population in particular.

In our study, the most common comorbidities were high blood pressure and diabetes mellitus. Our results align with data from several African authors [8, 9, 11]. However, trends in Ethiopia differed, with HIV infection being the most common comorbidity, followed by diabetes mellitus [7]. The presence of these comorbidities can increase mortality.

In our study, the most frequent reasons for admission were impaired consciousness (57.7%), followed by hemodynamic instability (40.4%) and respiratory distress (26.3%). Involvement of these three systems (neurological, hemodynamic, and respiratory) is a common reason for ICU admission requiring organ support [17]. Regarding the source of infection, abdominal and central nervous system sites were the most frequently observed in our study. These results are similar to those of several other African studies, where abdominal infections are the leading source of infection [9, 15, 16]. These findings could be attributed to delays in seeking consultation and/or receiving care, lack of access to healthcare due to the absence of universal health insurance, and the use of self-medication with non-steroidal anti-inflammatory drugs (NSAIDs) - which may promote gastroduodenal perforations, particularly in patients with existing ulcers, leading to acute generalized peritonitis. Furthermore, fecal-borne diseases such as typhoid fever are common in sub-Saharan Africa, where they are endemic and a cause of peritonitis resulting from intestinal perforation. However, other authors have reported differing results. In Ethiopia, Cameroon, and DRC, respiratory sources

of infection were the most frequently observed in sepsis-related studies [7, 8, 16, 18]. In Europe, the SOAP study identified respiratory sources of infection as the leading cause in ICUs, followed by abdominal infections [19].

Clinically, we found that patients had a median GCS of 12, with the majority (39.1%) falling within the 9-12 range. Arterial hypotension was observed in 41% of cases, and desaturation was present in 25.6% of patients. Our results are close to those reported by Metogo *et al.* in Cameroon and Sama *et al.* in Togo [15, 18]. Sepsis and septic shock are serious conditions affecting all body systems. In our study, 32.1% of patients presented with thrombocytopenia, suggesting that one-third of patients may have coagulation abnormalities. We also noted that 51.6% of patients had anemia, a factor that can contribute to increased mortality. Furthermore, the majority of patients did not undergo procalcitonin testing; only 8.8% were tested, with 87.5% of results being positive. Procalcitonin is an essential and specific marker of infection. This test should be performed on all septic patients and made widely accessible to better guide antibiotic management. Regarding the etiological workup for infection, it was performed in only 44.1% of cases. Peritoneal fluid analysis was not recorded in our study, even though an abdominal source of infection was the most frequently observed. Low population income and the lack of universal health insurance make it difficult to perform additional diagnostic tests, thereby compromising the effectiveness of patient management - which should ideally be guided by an antibiogram to prevent the emergence of MRB.

The median SOFA score was 9 [5.2-11], with a range of 0 to 20. A SOFA score between 7 and 14 was observed in 62.8% of cases. These results highlight the high severity of illness among patients admitted for sepsis. Our findings are similar to those reported by Quenot *et al.* [20] and Boussekey *et al.* [21] in France (10.9 and 11, respectively), as well as by Metogo *et al.* in Cameroon and Balcan *et al.* in Turkey (9.2 and 9.1, respectively) [18, 22]. Previous studies have shown that a decrease in the SOFA score predicts reduced mortality, whereas an increase indicates greater severity and, consequently, higher mortality [18, 22]. Antibiotic therapy is essential in the management of sepsis. Initially empirical, treatment is subsequently adjusted based on susceptibility testing results, underscoring the importance of performing tests to identify the causative pathogen. In our study, all patients received empirical antibiotic therapy. Combination therapy involving two antibiotics was used in 47.9% of cases, and three antibiotics in 42.2%. The most frequently used agents were third-generation cephalosporins (84%), imidazoles (81.4%), and aminoglycosides (26.9%). These results align with those of most African studies [7-9, 11, 16, 18]. All patients underwent fluid resuscitation with crystalloids. Patients received oxygen therapy (75%) and mechanical ventilation (64.1%), and required vasoactive drugs infusions (55.1%). Surgical treatment was performed in 26.5% of cases. This primarily involved exploratory laparotomy. Managing sepsis in the ICU entails eradicating the source of infection through surgery and/or antibiotic

therapy, as well as providing organ support. Care must be rapid and optimal to improve patient survival.

In our study, the most frequent organ failure was neurological (septic encephalopathy) at 63.5%, followed by renal failure (57.7%). The median length of stay was 3 days. These results are similar to those of Metogo *et al.* and Guilba *et al.* [11, 18]. In their study on septic shock in the ICU in Morocco, all patients presented with at least one organ failure, predominantly neurological (83%), followed by pulmonary (74%) and renal (52%) failure [23]. We recorded a mortality rate of 33.3%. This result is quite close to that reported by Metogo *et al.* in Cameroon and Katénbo *et al.* in DRC [18, 24]. It is lower than the rates observed by Guilba *et al.* in Mali, Sama *et al.* in Togo, and Niengo *et al.* in the Republic of Congo, who reported mortality rates of 49.2%, 50%, and 57.1%, respectively [9, 11, 15]. This high mortality rate for sepsis in the ICU aligns with rates reported in the literature, ranging from 25.8% to 60.1% [13, 18, 23, 25]. In developed countries, sepsis-related mortality ranges from 15% to 25%, whereas mortality associated with septic shock can reach 30% to 40% [26].

We sought to identify factors associated with death from sepsis in the ICU. In our study, statistical analysis revealed the following independent factors associated with death from sepsis in the ICUs: impaired consciousness, surgical treatment, mechanical ventilation, a SOFA score of 11-14, and the presence of organ failure. Metogo *et al.* identified age (1 year), GCS (8), mean blood pressure or MAP (65 mmHg), and mechanical ventilation as mortality risk factors [18]. In the DRC, the following variables were independently associated with mortality in septic patients in the ICU: a delay in ICU admission exceeding 5 days, low socioeconomic status, lack of health insurance, GCS score ≤ 10 , $\text{SpO}_2 < 90\%$, serum creatinine ≥ 3 mg/dL, and blood glucose ≥ 8 mmol/L (1.45 g/L) [8, 24]. These results confirm common mortality risk factors identified in the literature [18, 23, 26-28].

5. Conclusion

Sepsis is a serious and common condition in ICUs in the Republic of Congo. It affects a young adult population - regardless of gender or income stability - with a medical history of high blood pressure and/or diabetes mellitus, presenting with a severe infection of gastrointestinal or meningeal origin accompanied by neurological and/or renal failure. Sepsis-related mortality remains high. Our study identified several factors independently associated with mortality: impaired consciousness, the need for surgical treatment, mechanical ventilation, a SOFA score of 11-14, and the presence of organ failure. Reducing sepsis-related morbidity and mortality will require improvements in human and material resources, continuous staff training, universal health coverage, the availability and rational prescribing of antibiotics, and close collaboration with medical laboratories to ensure universal access to bacteriological testing and to reduce the time required to obtain results - all of which are essential for adequate patient management.

Abbreviations

aOR	Ajusted Odds Ratio
ASGH	Adolph Sice General Hospital
BUH	Brazzaville University Hospital
CRP	C-reactive Protein
CVC	Central Venous Catheter
DGH	Djiri General Hospital
DRC	Democratic Republic of Congo
GCS	Glasgow Coma Score
GFR	Glomerular Filtration Rate
ICUs	Intensive Care Units
MRB	Multi-Resistant Bacteria
OR	Odds Ratio
PCT	Procalcitonin
qSOFA	Quick Sequential Organ Failure Assessment
SIRS	Systemic Inflammatory Response Syndrome
SOFA	Sequential Organ Failure Assessment
TRH	Talanga i Referral Hospital
WHO	World Health Organization

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Author Contributions

Elombila Marie: Conceptualization, Data curation, Formal Analysis, Methodology, Software, Writing – review & editing

Mpoy Emy Monkessa Christ Mayick: Formal Analysis, Methodology, Writing – original draft, Writing – review & editing

Nakavoua Zoner: Data curation, Investigation, Methodology, Software, Writing – original draft

Niengo Outsouta Gilles: Formal Analysis, Resources, Visualization

Bayoundoula Ghislaine: Resources, Visualization

Nde Ngala Marina Aurole: Resources, Visualization

Iwoba Rebet Sarrah Armanda: Resources

Kibamba Nieme Isaac: Resources

Boyewi Jeancia: Resources

Koumou Regis: Resources

Otiobanda Gilbert Fabrice: Project administration, Supervision, Validation

Conflicts of Interest

The authors declare no conflicts of interest.

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