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Epidemiological and clinical characteristics associated with SARS-CoV-2 positivity in Burkina Faso: a retrospective hospital-based study during the first year of the COVID- 19 pandemic

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Abstract

Background: Evidence on the epidemiological and clinical characteristics of COVID-19 in sub-Saharan Africa during the early pandemic phase remains limited. Routine surveillance data may help inform epidemic preparedness and context-adapted testing strategies in resource-constrained settings.

Objective: To describe the epidemiological and clinical characteristics associated with SARS-CoV-2 positivity among suspected COVID-19 cases in Burkina Faso during the first pandemic year.

Methods: We conducted a retrospective cross-sectional analytical study using routine surveillance data collected between 13 May 2020 and 12 May 2021 at the Sourô Sanou University Hospital Centre, a regional referral centre for COVID-19 surveillance and management in western and southern Burkina Faso. All suspected COVID-19 cases tested by RT-PCR were included. Sociodemographic, clinical and laboratory data were extracted from standardised surveillance records. Comparisons between RT-PCR-confirmed and non-confirmed cases used Pearson's chi-square or Fisher's exact tests, as appropriate. Variables significantly associated with SARS-CoV-2 positivity in bivariate analyses were included in multivariable logistic regression models.

Results: Among 2,463 suspected COVID-19 cases, 926 tested positive for SARS-CoV-2 (positivity rate: 37.6%). The mean age of suspected cases was 40.7 years, whereas individuals aged 30–44 years represented the largest proportion of confirmed cases (31.8%). Confirmed cases were predominantly from urban areas (92.7%), and the most frequent symptoms were cough (61.7%), headache (43.4%), asthenia (36.2%) and fever (35.9%). In multivariable analyses, anosmia (OR=2.31; 95% CI: 1.77–3.02) and ageusia (OR=1.68; 95% CI: 1.28–2.20) showed the strongest associations with SARS-CoV-2 positivity. Cough, headache and asthenia were also independently associated with positivity.

Conclusions: During the first year of the COVID-19 pandemic in Burkina Faso, SARS-CoV-2 positivity was characterised by urban predominance and strong associations with alterations in smell and taste. These findings highlight the value of routine surveillance data for strengthening clinical suspicion and informing locally adapted epidemic response strategies in resource-constrained settings.

Key message

- **What is already known on this topic**

Early evidence on the epidemiological and clinical characteristics of COVID-19 was largely derived from high-income countries, with limited evidence from sub-Saharan Africa to inform context-specific surveillance and testing strategies.

- **What this study adds**

Using routine hospital-based surveillance data from Burkina Faso, this study identifies epidemiological patterns and clinical features associated with SARS-CoV-2 positivity during the first pandemic year.

- **How this study might affect research, practice or policy**

These findings support the use of routine surveillance data to strengthen clinical suspicion, guide testing prioritisation and generate locally relevant evidence for epidemic preparedness in resource-constrained settings.

Introduction

Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged as a global public health emergency shortly after its identification in late 2019 (1, 2). Although substantial advances were made in understanding the epidemiology and clinical presentation of COVID-19 during the early phases of the pandemic, much of the available evidence initially originated from high-income countries, where health system capacity, testing availability and surveillance infrastructures differed considerably from those of many low- and middle-income settings (3–5).

In sub-Saharan Africa, the interpretation of COVID-19 epidemiological trends was complicated by heterogeneous testing strategies, limited laboratory capacity, differences in healthcare-seeking behaviours and variations in demographic and socioeconomic profiles (6). These contextual factors may have influenced both the identification of suspected cases and the clinical spectrum observed among individuals tested for SARS-CoV-2 infection. Consequently, concerns emerged regarding the direct applicability of clinical and epidemiological patterns described in high-income settings to African populations, particularly during the first year of the pandemic when diagnostic resources remained constrained in many countries (6, 7).

During the early pandemic response, clinical identification of suspected COVID-19 cases represented a major component of surveillance and patient triage strategies, especially in settings where timely molecular confirmation was not always readily accessible (8). Several studies conducted in Europe, Asia and North America reported fever, cough, fatigue and headache among the most frequent symptoms associated with COVID-19 (9), while anosmia and ageusia were progressively recognised as more specific manifestations of SARS-CoV-2 infection (10). However, the distribution and relative importance of these clinical features appeared to vary across populations and healthcare contexts (9). In addition, underlying chronic conditions such as diabetes and cardiovascular diseases were consistently associated with more severe forms of COVID-19 (11, 12), although data from West African hospital-based surveillance settings remained comparatively limited.

In Burkina Faso, the first confirmed cases of COVID-19 were reported in March 2020, leading to the rapid implementation of national surveillance, testing and case management strategies (13). Referral hospitals played a central role in the coordination of suspected case identification, sample collection and laboratory confirmation. Nevertheless, evidence documenting the epidemiological distribution and clinical characteristics of suspected and confirmed COVID-19 cases during the first year of the pandemic in Burkina Faso remains scarce.

Routine surveillance data may provide valuable context-specific evidence to characterise early SARS-CoV-2 transmission dynamics and symptom profiles in resource-constrained settings, where testing capacity was often limited during the first pandemic year. Such data can inform locally adapted testing prioritisation strategies and contribute to building epidemic preparedness for future outbreaks.

This study aimed to describe the epidemiological and clinical profiles of suspected COVID-19 cases and identify symptoms associated with SARS-CoV-2 positivity among individuals tested at the Sourô Sanou University Hospital Centre (CHUSS), a regional referral hospital in western Burkina Faso, during the first pandemic year.

Methods

Study design and setting

We conducted a retrospective cross-sectional analytical study using routine COVID-19 surveillance data collected between 13 May 2020 and 12 May 2021 at the CHUSS in Bobo-Dioulasso, Burkina Faso.

During the first year of the pandemic, CHUSS served as a regional referral centre for COVID-19 surveillance, clinical care and SARS-CoV-2 diagnostic testing across western and southern Burkina Faso. The Infectious Diseases Department coordinated the clinical assessment and management of suspected cases, while the Bacteriology-Virology laboratory performed molecular confirmation of SARS-CoV-2 infection.

Study population and eligibility criteria

The study included all individuals classified as suspected COVID-19 cases who underwent SARS-CoV-2 reverse transcription polymerase chain reaction (RT-PCR) testing at CHUSS during the study period.

Suspected cases were defined according to the World Health Organization (WHO) case definitions applicable during the study period as (14): (i) patients presenting with acute respiratory infection, defined by fever and at least one respiratory symptom (cough or dyspnoea), together with an epidemiological link within the preceding 14 days, including contact with a COVID-19 cluster or travel to an affected area; (ii) patients presenting with severe acute respiratory infection (SARI), defined by fever and at least one respiratory symptom (cough or dyspnoea), with documented contact within the previous 14 days with a probable or confirmed COVID-19 case; or (iii) patients hospitalised with SARI without an alternative aetiology fully explaining the clinical presentation and for whom COVID-19 could not be excluded on clinical or laboratory grounds, including RT-PCR testing where available.

Individuals with incomplete RT-PCR results were excluded from the analysis.

Data sources and data collection

Data were extracted from the national COVID-19 epidemiological surveillance database and standardised case investigation forms routinely completed during clinical assessment and epidemiological investigations. Extracted information included sociodemographic characteristics, clinical presentation, comorbidities and laboratory findings for outpatient and inpatient individuals referred for SARS-CoV-2 testing. All analyses were conducted using anonymised surveillance records.

Laboratory procedures

Nasopharyngeal and/or oropharyngeal specimens were collected from suspected cases in accordance with national COVID-19 surveillance procedures. Samples were placed in viral transport media, maintained under cold-chain conditions and transported to the CHUSS Bacteriology-Virology laboratory for molecular analysis.

SARS-CoV-2 RNA detection was performed using real-time RT-PCR assays following national diagnostic protocols in use during the study period. Individuals with positive RT-PCR results were classified as confirmed COVID-19 cases.

Study variables

The primary outcome was SARS-CoV-2 infection status based on RT-PCR results (positive vs negative). Sociodemographic variables included age, sex, place of residence, occupational category and self-reported face mask use. Clinical variables comprised patient status (outpatient or inpatient), symptoms reported at presentation (fever, cough, headache, sore throat, shortness of breath, asthenia, rhinorrhoea, anosmia, ageusia, nausea, diarrhoea, pain and irritability) and reported comorbidities, including cardiovascular disease, diabetes, pulmonary disease, sickle cell disease, kidney disease and pregnancy status.

Statistical analysis

Data were analysed using R software version 4.4.3. Quantitative variables were summarised using means and standard deviations (SD), whereas categorical variables were described using frequencies and proportions.

Comparisons between RT-PCR-confirmed and non-confirmed cases were performed using Pearson’s chi-square test or Fisher’s exact test, as appropriate. Variables associated with RT-PCR positivity in these bivariate analyses, together with clinically relevant variables, were included in multivariable logistic regression models to identify factors independently associated with SARS-CoV-2 positivity.

Multivariable analyses were performed using binary logistic regression with backward stepwise selection. Model parsimony was assessed using the Akaike Information Criterion (AIC). Multicollinearity was evaluated using the Variance Inflation Factor (VIF), while model diagnostics and influential

observations were examined graphically to assess model robustness. Potential interaction terms were explored through comparisons of AIC values between models. Model calibration was assessed using the Hosmer-Lemeshow goodness-of-fit test.

Ethical considerations

This study was based on secondary analysis of anonymised routine surveillance data collected as part of the national COVID-19 response coordinated by the Ministry of Health of Burkina Faso. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki, as applicable to secondary analyses of anonymised routine public health surveillance data, and complied with the national ethical requirements governing public health surveillance activities. In line with national surveillance procedures implemented during the pandemic, which were approved by the Health Research Ethics Committee (CERS) of Burkina Faso, informed consent was obtained at the time of data collection. No additional personal identifiers were used for the present analysis, and only fully anonymised data were accessed by the investigators.

Results

Sociodemographic characteristics

Among 2,463 suspected COVID-19 cases tested by RT-PCR, 926 were confirmed positive for SARS-CoV-2, yielding an overall positivity rate of 37.6%.

The mean age of suspected cases was 40.7 years (SD: 18.4; range: 0–115 years). Individuals aged 30–44 years represented the largest proportion of both suspected (32.1%) and confirmed cases (31.8%). The age distribution differed significantly according to RT-PCR status ($p < 0.001$), with confirmed cases proportionally more frequent among older age groups, particularly individuals aged 45 years and above (Table 1).

Males accounted for 53.6% of the study population (male-to-female ratio: 1.15), although sex distribution did not differ significantly between confirmed and non-confirmed cases ($p = 0.37$).

Most suspected cases were identified in urban settings (88.7%), and urban residents represented 92.7% of RT-PCR-confirmed cases. Confirmed cases were geographically concentrated in Bobo-Dioulasso and surrounding urban districts, with the highest burden observed in the Do district (Fig. 1).

Occupational distribution varied significantly according to SARS-CoV-2 infection status ($p < 0.001$). Civil servants represented the largest occupational category among confirmed cases (26.2%), followed by informal sector workers (14.4%), students (14.3%) and healthcare workers (10.5%). Retired individuals were proportionally more represented among confirmed than non-confirmed cases.

Self-reported face mask use was reported by 58.1% of participants and was more frequent among RT-PCR-confirmed than non-confirmed cases (61.5% vs 56.0%; p = 0.008).

Table 1
Sociodemographic characteristics of suspected COVID-19 cases according to SARS-CoV-2 RT-PCR status

Characteristics	**Total**	**RT-PCR-negative**	**RT-PCR-positive**	**p value**
	N = 2,463	**N = 1,537**	**N = 926**	
	n (%)	**n (%)**	**n (%)**	
Age group (years)				< 0.001
0–14	147 (6.0)	121 (7.9)	26 (2.8)	
15–29	576 (23.4)	382 (24.9)	194 (21.0)	
30–44	790 (32.1)	496 (32.3)	294 (31.8)	
45–59	502 (20.4)	288 (18.7)	214 (23.1)	
60–74	349 (14.2)	199 (13.0)	150 (16.2)	
≥ 75	99 (4.0)	51 (3.3)	48 (5.2)	
Sex				0.37
Female	1,143 (46.4)	724 (47.1)	419 (45.2)	
Male	1,320 (53.6)	813 (52.9)	507 (54.8)	
Occupational category				< 0.001
Civil servants	552 (22.4)	309 (20.1)	243 (26.2)	
Informal sector workers	339 (13.8)	206 (13.4)	133 (14.4)	
Students	420 (17.1)	288 (18.7)	132 (14.3)	
Healthcare workers	253 (10.3)	156 (10.1)	97 (10.5)	
Homemakers/domestic workers	268 (10.9)	180 (11.7)	88 (9.5)	
Retired persons	133 (5.4)	66 (4.3)	67 (7.2)	
Farmers/livestock workers	121 (4.9)	86 (5.6)	35 (3.8)	
Self-reported face mask use				0.008
Yes	1,430 (58.1)	861 (56.0)	569 (61.5)	
No	1,033 (41.9)	676 (44.0)	357 (38.5)	

Clinical characteristics

The distribution of clinical characteristics differed substantially according to SARS-CoV-2 RT-PCR status (Table 2). Among confirmed cases, the most frequently reported symptoms were cough (61.7%), headache (43.4%), asthenia (36.2%) and fever (35.9%).

Compared with RT-PCR-negative individuals, confirmed cases more frequently reported cough (61.7% vs 50.9%; $p < 0.001$), headache (43.4% vs 32.9%; $p < 0.001$), asthenia (36.2% vs 24.2%; $p < 0.001$), fever (35.9% vs 30.0%; $p = 0.003$) and body pain (32.7% vs 27.7%; $p = 0.008$). Alterations in smell and taste were markedly more common among confirmed cases, with anosmia and ageusia each reported in approximately one-quarter of RT-PCR-positive individuals, compared with around 10% among RT-PCR-negative individuals (both $p < 0.001$).

Shortness of breath tended to be more frequently reported among confirmed cases, although the difference did not reach statistical significance (23.2% vs 20.0%; $p = 0.056$). No significant differences were observed for rhinorrhoea, sore throat, nausea, diarrhoea or irritability.

The proportion of inpatients and outpatients was comparable between confirmed and non-confirmed cases ($p = 0.82$). Regarding comorbidities, cardiovascular disease (11.5% vs 7.5%; $p = 0.001$), diabetes (5.8% vs 2.6%; $p < 0.001$) and sickle cell disease (1.5% vs 0.6%; $p = 0.021$) were more frequently reported among RT-PCR-confirmed individuals. In contrast, no significant differences were observed for pulmonary disease, kidney disease, pregnancy/postpartum status or other reported comorbidities.

Table 2
Clinical characteristics of suspected COVID-19 cases according to SARS-CoV-2 RT-PCR status

Characteristics	Total N = 2,463 n (%)	RT-PCR-negative N = 1,537 n (%)	RT-PCR-positive N = 926 n (%)	p value
Patient status				0.82
Inpatients	375 (15.2)	236 (15.4)	139 (15.0)	
Outpatients	2,088 (84.8)	1,301 (84.6)	787 (85.0)	
Symptoms				
Cough	1,354 (55.0)	783 (50.9)	571 (61.7)	< 0.001
Headache	907 (36.8)	505 (32.9)	402 (43.4)	< 0.001
Asthenia	707 (28.7)	372 (24.2)	335 (36.2)	< 0.001
Fever	793 (32.2)	461 (30.0)	332 (35.9)	0.003
Rhinorrhoea	848 (34.4)	517 (33.6)	331 (35.8)	0.29
Body pain	728 (29.6)	425 (27.7)	303 (32.7)	0.008
Anosmia	388 (15.8)	151 (9.8)	237 (25.6)	< 0.001
Ageusia	390 (15.8)	158 (10.3)	232 (25.1)	< 0.001
Shortness of breath	522 (21.2)	307 (20.0)	215 (23.2)	0.056
Sore throat	472 (19.2)	299 (19.5)	173 (18.7)	0.64
Nausea	174 (7.1)	101 (6.6)	73 (7.9)	0.22
Diarrhoea	73 (3.0)	43 (2.8)	30 (3.2)	0.53
Irritability	22 (0.9)	10 (0.7)	12 (1.3)	0.10
Other symptoms	29 (1.2)	21 (1.4)	8 (0.9)	0.26
Comorbidities				
Cardiovascular disease	222 (9.0)	116 (7.5)	106 (11.5)	0.001
Diabetes	94 (3.8)	40 (2.6)	54 (5.8)	< 0.001
Pulmonary disease	58 (2.4)	34 (2.2)	24 (2.6)	0.55
Sickle cell disease	23 (0.9)	9 (0.6)	14 (1.5)	0.021
Kidney disease	29 (1.2)	21 (1.4)	8 (0.9)	0.26

*People with neurological and gastrointestinal diseases, and HIV-positive status

Characteristics	Total N = 2,463 n (%)	RT-PCR-negative N = 1,537 n (%)	RT-PCR-positive N = 926 n (%)	p value
Pregnancy/postpartum status	25 (1.0)	18 (1.2)	7 (0.8)	0.32
Other comorbidities*	24 (1.0)	16 (1.0)	8 (0.9)	0.66
*People with neurological and gastrointestinal diseases, and HIV-positive status				

Factors associated with SARS-CoV-2 RT-PCR positivity

In multivariable analyses, alterations in smell and taste showed the strongest associations with SARS-CoV-2 RT-PCR positivity (Table 3). Individuals reporting anosmia had more than twice the odds of testing positive for SARS-CoV-2 compared with those not reporting this symptom (OR = 2.31; 95% CI: 1.77–3.02; $p < 0.001$), while ageusia was associated with a 68% increase in the odds of RT-PCR positivity (OR = 1.68; 95% CI: 1.28–2.20; $p < 0.001$).

Other symptoms positively associated with SARS-CoV-2 positivity included cough (OR = 1.36; 95% CI: 1.11–1.66; $p = 0.003$), headache (OR = 1.33; 95% CI: 1.08–1.63; $p = 0.006$) and asthenia (OR = 1.30; 95% CI: 1.05–1.60; $p = 0.017$).

In contrast, no statistically significant associations were observed for self-reported face mask use, fever or body pain. Although diabetes and cardiovascular disease were more frequently reported among RT-PCR-confirmed cases in descriptive analyses, these variables were not significantly associated with SARS-CoV-2 positivity in the regression analyses presented in Table 3.

Table 3
Multivariable logistic regression analyses of factors associated with SARS-CoV-2 RT-PCR positivity among suspected COVID-19 cases

Variables	Adjusted OR	95% CI	p value
Self-reported face mask use			
No	Reference	—	—
Yes	1.06	0.85–1.31	0.60
Symptoms			
Fever			
No	Reference	—	—
Yes	1.07	0.87–1.32	0.50
Asthenia			
No	Reference	—	—
Yes	1.30	1.05–1.60	0.017
Cough			
No	Reference	—	—
Yes	1.36	1.11–1.66	0.003
Ageusia			
No	Reference	—	—
Yes	1.68	1.28–2.20	< 0.001
Headache			
No	Reference	—	—
Yes	1.33	1.08–1.63	0.006
Anosmia			
No	Reference	—	—
Yes	2.31	1.77–3.02	< 0.001
Body pain			
No	Reference	—	—
Yes	0.93	0.75–1.15	0.50

Discussion

This study provides detailed hospital-based epidemiological and clinical data on suspected and RT-PCR-confirmed COVID-19 cases identified during the first pandemic year in Burkina Faso. Among individuals tested for SARS-CoV-2 infection, more than one-third were RT-PCR positive, with confirmed cases predominantly concentrated in urban settings and among adults aged 30 years and above. Cough, headache, asthenia and fever were the most frequently reported symptoms among confirmed cases, while alterations in smell and taste showed the strongest associations with SARS-CoV-2 positivity in multivariable analyses.

The overall positivity rate observed in this study (37.6%) was relatively high in comparison with estimates reported in several broader surveillance or community-based studies conducted during the early phases of the pandemic (15–17). This finding likely reflects, at least in part, the testing strategies implemented in many low-resource settings during the first pandemic year, when molecular diagnostic capacity remained constrained and testing was frequently prioritised for symptomatic individuals, suspected cases or persons referred through hospital-based surveillance systems. The role of CHUSS as a regional referral centre for COVID-19 diagnosis and management may also have contributed to the concentration of individuals with clinically compatible presentations and a higher pre-test probability of infection. In addition, temporal variations in epidemic transmission intensity, public health measures and healthcare-seeking behaviours during the study period may have influenced testing patterns and observed positivity rates.

The age distribution of confirmed cases observed in this study is broadly consistent with patterns reported during the early pandemic period in several African and international settings, where infections were predominantly documented among working-age adults (18, 19). Individuals aged 30–44 years represented the largest proportion of confirmed cases, while older adults were proportionally more represented among RT-PCR-positive individuals than among RT-PCR-negative cases. These patterns may partly reflect differences in occupational exposure, mobility and social interaction profiles during the early stages of the pandemic. Adults engaged in professional and commercial activities may have experienced greater exposure opportunities, particularly in urban environments where physical distancing measures may have been difficult to sustain. Conversely, children accounted for a relatively small proportion of confirmed cases. This observation may reflect lower healthcare utilisation, differences in symptom severity, under-recognition of mild infections among younger individuals or testing policies that prioritised symptomatic adults during periods of limited diagnostic capacity. However, because the study population was restricted to clinically suspected cases presenting within a hospital-based surveillance system, these findings should not be interpreted as representative of age-specific infection risks in the general population.

The marked urban predominance of confirmed cases, particularly within the Do district of Bobo-Dioulasso, is also noteworthy. Several contextual factors may plausibly explain this distribution, including higher population density, increased population mobility, greater intensity of commercial and

administrative activities and improved geographical access to testing facilities in urban settings. Referral hospitals located in urban centres may additionally capture a larger proportion of symptomatic individuals and persons seeking diagnostic evaluation. Similar urban concentration of reported COVID-19 cases was observed during the first pandemic waves in several sub-Saharan African countries (20, 21), where surveillance and laboratory infrastructures were initially concentrated in major cities. The geographical clustering observed in the present study therefore likely reflects both transmission dynamics and structural differences in healthcare accessibility and surveillance coverage.

The clinical presentation identified among RT-PCR-confirmed cases was largely consistent with symptom profiles described during the early phases of the pandemic in other regions of the world (8, 9). Cough, headache, asthenia and fever were the most frequently reported manifestations among confirmed cases and were significantly more common among RT-PCR-positive than RT-PCR-negative individuals. Nevertheless, these symptoms were also highly prevalent among non-confirmed suspected cases, underscoring the limited specificity of common respiratory and constitutional symptoms within routine clinical surveillance contexts. In tropical and subtropical settings where multiple infectious diseases with overlapping clinical presentations co-circulate, distinguishing COVID-19 from other febrile or respiratory illnesses on clinical grounds alone may be particularly challenging (22, 23). This overlap reinforces the importance of maintaining laboratory diagnostic capacity during emerging infectious disease outbreaks, especially when syndromic presentations are non-specific.

Among the symptoms evaluated, alterations in smell and taste demonstrated the strongest associations with SARS-CoV-2 positivity. Individuals reporting anosmia had more than twice the odds of RT-PCR-confirmed infection, while ageusia was also strongly associated with positivity. These findings are highly consistent with evidence generated during the early pandemic period across multiple geographic settings, where olfactory and gustatory dysfunctions progressively emerged as clinically distinctive manifestations of SARS-CoV-2 infection (24, 25). These associations remained significant in multivariable analyses, supporting the potential relevance of anosmia and ageusia for reinforcing clinical suspicion in resource-constrained settings. Nevertheless, residual confounding and limitations inherent to routine surveillance data should be considered when interpreting these findings.

In contrast, fever and body pain, although more frequent among confirmed cases in descriptive analyses, were not significantly associated with SARS-CoV-2 positivity in regression analyses. This finding may further illustrate the limited discriminatory value of several common systemic symptoms among clinically suspected patients. Similarly, the absence of a statistically significant association between self-reported face mask use and RT-PCR positivity should be interpreted cautiously. Self-reported preventive behaviours are inherently vulnerable to reporting and social desirability biases, particularly in contexts of intense public health messaging. Moreover, the available surveillance data did not capture important dimensions of preventive practices, including adherence consistency, mask quality, exposure intensity or concurrent mitigation measures. Consequently, these findings should not be interpreted as evidence regarding the effectiveness of face mask use for preventing SARS-CoV-2 transmission.

Cardiovascular disease, diabetes and sickle cell disease were more frequently reported among RT-PCR-confirmed individuals in descriptive analyses. However, these conditions were not significantly associated with SARS-CoV-2 positivity in the regression analyses presented. Importantly, the present study was designed to assess epidemiological and clinical characteristics associated with RT-PCR-confirmed infection among suspected cases rather than determinants of severe disease or mortality. Comorbidities previously associated with adverse COVID-19 outcomes may therefore not necessarily be associated with the probability of testing positive within a clinically selected population of suspected cases. In addition, the relatively low frequency of some comorbidities, potential underreporting and residual confounding inherent to routine surveillance data may limit the interpretability of these observations. Further studies specifically designed to evaluate clinical severity and outcomes would be necessary to better characterise the role of chronic conditions in the Burkinabè context.

This study has several important strengths. It relies on routine surveillance data collected during the first year of the pandemic in a regional referral centre serving a large catchment area in western and southern Burkina Faso. The relatively large sample size, systematic RT-PCR confirmation and inclusion of both inpatient and outpatient suspected cases strengthen the robustness of the epidemiological and clinical descriptions provided. In addition, this study contributes to locally generated evidence from a sub-Saharan African setting that remained comparatively underrepresented in the early COVID-19 literature. Such context-specific evidence is particularly important given the substantial heterogeneity in surveillance systems, healthcare access and testing strategies across settings during the pandemic.

Several limitations should nevertheless be considered when interpreting the findings. First, the hospital-based design may limit generalisability beyond individuals identified through referral and surveillance pathways, and symptomatic patients may have been overrepresented. Second, changes in testing availability, surveillance strategies and healthcare-seeking behaviours over time may have influenced case identification patterns throughout the study period. Third, some clinical variables and preventive behaviours were self-reported and may therefore be affected by recall bias, reporting bias or incomplete documentation. Finally, although multivariable logistic regression analyses were performed, the use of routine surveillance data may not have allowed full control for residual confounding, measurement error or unmeasured variables potentially influencing SARS-CoV-2 positivity.

Despite these limitations, the present study provides valuable evidence regarding the epidemiological distribution and clinical presentation of suspected and confirmed COVID-19 cases during the first pandemic year in Burkina Faso. The findings highlight the importance of routine surveillance systems as sources of locally relevant evidence during emerging infectious disease outbreaks, particularly in settings where research infrastructures and diagnostic resources may initially be limited. They also support the potential utility of specific symptom profiles, notably alterations in smell and taste, for strengthening clinical suspicion and informing context-adapted testing strategies during early epidemic response phases. More broadly, these results underscore the importance of strengthening integrated surveillance and diagnostic capacities to improve preparedness for future epidemic threats in resource-constrained settings.

Conclusion

This study provides important context-specific evidence on the epidemiological distribution and clinical presentation of suspected and RT-PCR-confirmed COVID-19 cases during the first year of the pandemic in Burkina Faso. SARS-CoV-2 positivity was predominantly identified among urban-dwelling and working-age adults, reflecting the central role of urban transmission dynamics and population mobility during the early phases of the epidemic. Among confirmed cases, cough, headache, asthenia and fever were the most frequently reported symptoms, although these manifestations remained relatively non-specific within routine surveillance settings. In contrast, alterations in smell and taste showed the strongest independent associations with RT-PCR positivity, supporting their potential utility for strengthening clinical suspicion and informing context-adapted testing prioritisation strategies in resource-constrained settings.

Beyond the specific context of COVID-19, these findings underscore the critical importance of routine surveillance systems as sources of timely and locally relevant evidence during emerging infectious disease outbreaks. In settings where diagnostic resources and research infrastructures remain constrained, investing in integrated surveillance, laboratory and analytical capacities is essential to support early outbreak detection, guide response efforts, and strengthen public health system resilience in sub-Saharan Africa.

Abbreviations

CERS
Health Research Ethics Committee
CI
Confidence Interval
CHUSS
Sourô Sanou University Hospital Centre
CNRST
National Centre for Scientific and Technological Research
COVID-19
Coronavirus disease 2019
IRSS
Institute for Health Sciences Research
ISED
Institute of Health and Development
OR
Odds Ratio
RT-PCR
Reverse Transcription Polymerase Chain Reaction
SARI

Severe Acute Respiratory Infection
SARS-CoV-2
Severe Acute Respiratory Syndrome Coronavirus 2
SD
Standard Deviation
UCAD
Cheikh Anta Diop University

Declarations

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Armel Poda: Methodology, Writing – review & editing

Abdoul-Salam Ouedraogo: Project administration, Supervision, Validation, Writing – review & editing

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Disclaimer

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Competing interests

The authors declare no competing interests.

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Figures

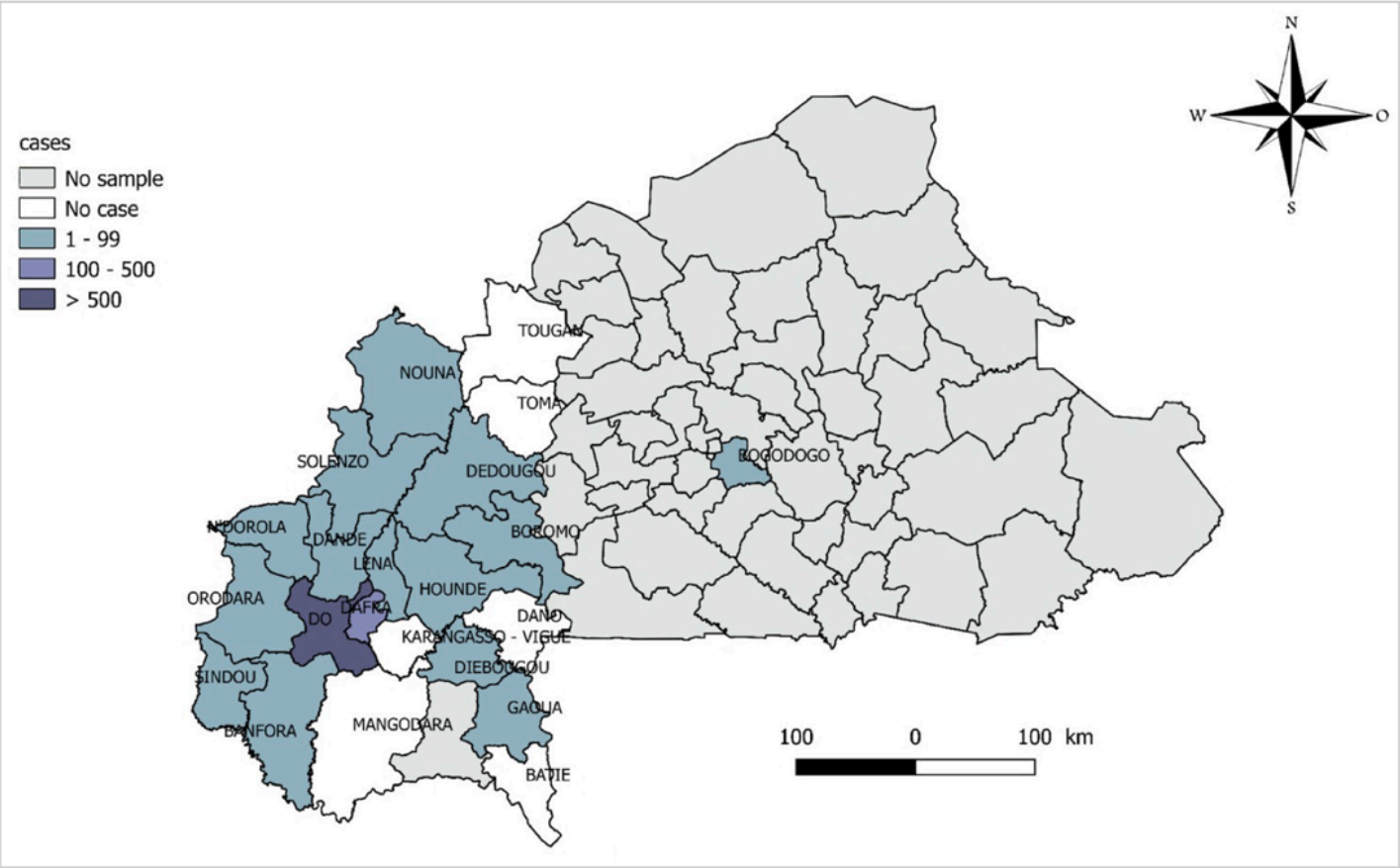


Figure 1

Geographical distribution of RT-PCR-confirmed COVID-19 cases identified through hospital-based surveillance in western and southern Burkina Faso, May 2020–May 2021

The map illustrates the spatial distribution of RT-PCR-confirmed COVID-19 cases reported to the Sourô Sanou University Hospital Centre during the first year of the COVID-19 pandemic. The highest concentration of confirmed cases was observed in the Do health district of Bobo-Dioulasso.