Health Sciences & Disease
The Journal of Medicine and Biomedical Sciences

Article Original

Diagnosis, Experiences and Coping Strategies of COVID-19 Patients in Bertoua

Diagnostic, Vécu et Stratégies d'Adaptation des Patients COVID-19 à l'Hôpital Régional de Bertoua

Vendeline Amaelle Goretti Mvong[1,2], Souleymane Sekou Diarra[2,3], Jean Marc Léré Tiama[2,4], Audrey Inna Nana Mbezou[5], Joel Lonla Nzougouat[6], Emilia Enjema Lyonga[7], Christian Gansi Abanda[8], Alexis Ousmane Deke[9], Innocent Takougang[1]

Affiliations

1. Department of Public Health, Faculty of Medicine and Biomedical Sciences, Yaounde, Cameroon;
2. Department of Public Health, Faculty of Medicine and Odonto-stomatology, University of Science Technics and Technology, Bamako, Mali;
3. National Institute of Public Health, Ministry of Health, Bamako, Mali,
4. District Hospital of Commune IV of Bamako, Mali;
5. University of Yaounde 1, Sociology, MINPAT, Cameroon;
6. Department of Statistics of the Ministry of Justice, Yaounde, Cameroon;
7. Department of microbiology, Hematology, Parasitology and Infectious Diseases, University of Yaounde 1, Cameroon;
8. Regional Training and Partnership Office, Bertoua Regional Delegation of Public Health, Cameroon;
9. Central Technical Group-Expanded Program on Immunization, Yaounde, Cameroon.

Auteur correspondant
V.A.G. Mvong
Tel: +22392232170
Email: mvongvendeline@gmail.com

Mots clés : Diagnosis, Experiences, COVID-19, Patients, Bertoua Regional Hospital, Cameroon.
Key words: Diagnostic, Vécu, Patients, COVID-19, Hôpital Régional de Bertoua, Cameroun.

Article history
Submitted: 25 July 2024
Revisions requested: 7 September 2024
Accepted: 15 September 2024
Published: 27 September 2024

ABSTRACT

Introduction. Research about Coronavirus disease 2019 (COVID-19) socio-economic impact on populations in Cameroon is almost non-existent. This research aimed to study the diagnosis, the knowledge gap on the experiences and coping strategies of COVID-19 patients. **Methodology.** We conducted a cross-sectional study with retrospective and prospective data collection on COVID-19 patients at the Bertoua Regional Hospital care unit, from May 2020 to April 2023. A database covering the participants' socio-demographic and diagnostic information's, and an online survey tool using google form were adapted from five questionnaires to highlight participants' experiences and describe their coping strategies. **Results.** We studied 364 COVID-19 patients. The most common signs and symptoms were cough (23.9%), fatigue (23.4%) and running nose (19.7%). Antigenic Rapid Diagnostic test was the most used (74%) from our findings. The presence of stigma by medical personnel was not associated with gender (P = 0.93), marital status (P = 0.45), presence of symptoms (P = 0.58). All factors showed a satisfactory internal consistency (as Cronbach's alpha>0.70). Average scores were reported for mental disengagement (2.8 ± 0.84), active and instrumental adaptation (2.7 ± 0.86), as well as suppression of competing activity (2.6±0.84), thus were the most adopted coping strategies. **Conclusion.** Based on the current research results, COVID-19 patients dealt with self-esteem, self-stigmatization and developed mental disorders. There is need to focus on the experiences and coping strategies of patients during the infection period and post-recovery during pandemics.

RÉSUMÉ

Introduction. La recherche sur l'impact socio-économique du Coronavirus 2019 (COVID-19) sur les populations au Cameroun est presque inexistante. Cette recherche visait à étudier le diagnostic, le manque de connaissances sur les expériences et les stratégies d'adaptation des patients atteints de COVID-19. **Méthodologie.** Nous avons mené une étude transversale avec collecte de données rétrospectives et prospectives sur les patients atteints de COVID-19 à l'unité de soins de l'hôpital régional de Bertoua, de mai 2020 à avril 2023. Une base de données couvrant les informations sociodémographiques et diagnostiques des participants, et un outil d'enquête en ligne utilisant google form ont été adaptés à partir de cinq questionnaires pour mettre en évidence les expériences des participants et décrire leurs stratégies d'adaptation. **Résultats.** Nous avons étudié 364 patients atteints de COVID-19. Les signes et symptômes les plus courants étaient la toux (23,9 %), la fatigue (23,4 %) et le nez qui coule (19,7 %). D'après nos résultats, le test de diagnostic rapide antigénique était le plus utilisé (74 %). La présence de stigmatisation par le personnel médical n'était pas associée au sexe (P = 0,93), à l'état civil (P = 0,45), à la présence de symptômes (P = 0,58). Tous les facteurs ont montré une cohérence interne satisfaisante (alpha de Cronbach>0,70). Des scores moyens ont été rapportés pour le désengagement mental (2,8 ± 0,84), l'adaptation active et instrumentale (2,7 ± 0,86), ainsi que la suppression d'activités concurrentes (2,6±0,84), qui sont donc les stratégies d'adaptation les plus adoptées. **Conclusion.** D'après les résultats de la recherche actuelle, les patients atteints de COVID-19 ont été confrontés à l'estime de soi, à l'autostigmatisation et ont développé des troubles mentaux. Il est nécessaire de se concentrer sur les expériences et les stratégies d'adaptation des patients pendant la période d'infection et après la guérison pendant les pandémies.

HIGHLIGHTS

What is known of the subject

Research about Coronavirus disease 2019 (COVID-19) socio-economic impact on populations in Cameroon is almost non-existent.

The aim of our study

Diagnosis, Knowledge gap on the experiences and coping strategies of COVID-19 patients.

Key Results

1. The most common signs and symptoms were cough (23.9%), fatigue (23.4%) and running nose (19.7%).
2. Antigenic Rapid Diagnostic test was mostly used (74%) from our findings.
3. The presence of stigma by medical personnel was not associated with gender (P = 0.93), marital status (P = 0.45), presence of symptoms (P = 0.58).
4. All factors showed a satisfactory internal consistency (as Cronbach's alpha>0.70).
5. Average scores were reported for mental disengagement (2.8 ± 0.84), active and instrumental adaptation (2.7 ± 0.86), as well as suppression of competing activity (2.6±0.84), thus were the most adopted coping strategies

Implications for future practices and policies

There is need to focus on the experiences and coping strategies of patients during the infection period and post-recovery during pandemics.

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 virus) with symptoms ranging from asymptomatic or mild to severe illness and mortality. Common symptoms include fever, cough, and shortness of breath [1, 2]. COVID-19, an emerging and deadly pandemic of the 21st century, remains a global public health problem, affecting both developed and developing countries with persistent morbidity and mortality [3]. Africa accounted for 1.3% of cases (757.2 million) and 1.2% of deaths (6.8million) as of February 24th, 2023 [4]. In Cameroon, the World Health Organization reported 124 895 confirmed cases and 1 970 deaths with a 1.6% case fatality rate from January 3rd, 2020 to April 19th, 2023 [5]. The Bertoua Regional Hospital in the East region documented 5 458 confirmed cases and 84 deaths with a 1.5% lethality as of March 8th, 2023 [6]. This full-blown outbreak, made it urgent to find reliable, affordable, and accessible tests for fast and accurate COVID-19 diagnosis to prevent onward spread, enable case identification and provide timely care [7, 8]. Thus, COVID-19 clinical diagnosis has primarily relied on signs and symptoms evaluation and confirmation by Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) as gold standard [5, 8]. However, in low-income countries like Cameroon, implementing RT-PCR is challenging due to constant supply issues and the lack guaranteed free access. Consequently, Antigen Rapid Diagnostic Tests (Antigen-RDT) offer scalable and affordable alternatives to RT-PCR. In Cameroon, RT-PCR, RDT BIOSYNEX COVID-19 Ag BSS, and RDT BIOSYNEX COVID-19 Ag +BSS were the most commonly used diagnostic tests [11, 12]. Notwithstanding, a positive COVID-19 infection may prompt the fear of dying, helplessness and stigma, resulting in significant psychological distress and mental health issues such as stress, anxiety, depression, frustration, and uncertainty [13]. It also forces individuals to face various personal, physical, psychological, familial, and social challenges, prompting diverse coping strategies like behavioral disengagement, denial, acceptance, and substance use (alcohol or drugs) [14, 15]. However, empirical knowledge about the impact of the pandemic on COVID-19 patients in Cameroon, particularly regarding their daily tensions, the consequences of stigmatisation, and coping strategies is insufficient. This gap sparked our curiosity and motivated us to study these aspects from a cross sectional perspective (with a hypothesis that: the diagnosis, experiences and coping strategies vary amongst COVID-19 patients) at the Bertoua Regional Hospital, aiming to contribute to public health.

PATIENTS AND METHODS

Study design/duration and period/site

We conducted a cross-sectional study with retrospective and prospective data collection. This study took place three years in retrospect, from April 2020 to April 2023. Data collection was carried out from February 1st to April 30th, 2023 at the Bertoua Regional Hospital (BRH) care unit.

Study population and inclusion criteria

We included COVID-19 patients of the BRH care unit whose information's were complete, consistent and gave their consent.

Sampling

Simple random probability sampling from the database provided to us by the Regional Care Unit Coordinator was carried out. The sample size of at least 364 COVID-19 patients was obtained by Lorentz formula, relying on Ndoue *et al* [16] study to have our prevalence.

Data collection tools

A collection grid (for socio-demographic characteristics, signs and symptoms, types of tests), online questionnaires [Rosenberg Self-Esteem Scale, Self-Stigma Scale-Short (SSS) and the Depression, Anxiety and Stress Scale (DASS 21)] to highlight the experiences and Carver's Cope Inventory scale (for coping strategies).

Data collection procedure

The database was checked for inconsistencies and missing values. Using simple non-random sampling, a sample size of 364 was selected from 4,918 COVID-19 patients by generating a random number in Excel and calculating a step size of 13. Patients were selected sequentially using this step size, and in cases of incomplete information, the step was added to obtain the next patient. Telephone interviews were conducted to document experiences and coping strategies, ensuring anonymity, confidentiality, and consent. Electronic consent forms and information packages were sent to participants, who signed and returned them electronically. An electronic Trial Master File was created to archive these forms. Data was collected through Google Forms, with reminders sent via

phone, SMS, and WhatsApp to ensure completeness. Finally, the merging of the databases (experiences, coping and diagnosis from the survey frame) allowed us to describe their diagnosis in an appropriate way.

Bias

Response biais.

Classification of variables

The dependent variable in our study was coping strategies (active and instrumental adaptation, acceptance; elimination of competing activities, religious adaptation, behavioral disengagement, use of social emotional support, mental disengagement), derived from an adaptation of Carver's Coping Inventory scale, validated through factor and internal consistency analysis. The independent variables included socio-demographic factors (age, sex, occupation), diagnosis (signs and symptoms, type of test), and experiences (self-esteem, self-stigmatization, depression…).

Statistical analysis and processing

The data underwent univariate and bivariate statistical analysis. Univariate analysis highlighted the distribution of categories and samples, while bivariate analysis used variance analysis (ANOVA) with the Fischer statistic to determine associations. A significant P-value (less than 5%) indicated an association between the dependent and independent variables. Three software tools were employed: IBM/SPSS version 21 for sorting, recoding, and bivariate analysis; STATA 13 for developing the binomial logistic regression model; and Excel for creating tables and graphs.

Ethical and administrative procedures

The study was approved by the Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I (reference: No 13F/023/UYI/FMSB/DSP/CCS) prior its commencement, with additional authorizations from the Bertoua Regional Delegation of Public Health (No 521/L/MINSANTE/SG/DRSPE/BFP) and the Bertoua Regional Hospital (Register S/No 110/23). Informed consents were obtained from all participants, allowing them to join or withdraw from the study freely. All collected information was kept confidential.

RESULTS

Socio-demographic characteristics of the study population

A total of 364 COVID-19 patients took part in the study. Of those, the sex ratio was >1 in favor of men. Nearly 37.0% were aged between 25 and 44 years old. Occupations such as traders, farmers and students were the highest registered (80.5%), followed by Healthcare worker (11.8%) (Table I).

Table I. Distribution according to their socio-demographic characteristics

Variable	N=364	%
Sex		
Male	222	61.0
Female	142	39.0
Age (years)		
5-24	80	22.0
25-44	135	37.0
45-64	128	35.2
65-85	21	5.8
Occupation		
Healthcare workers	43	11.8
Traders/Farmers/students	293	80.5
Not declared	28	7.7

Diagnosis of the study population

Cough (23.9%), fatigue (23.4%) and running nose (19.7%) were the predominant signs and symptoms (Table II).

Table II. Distribution according to signs and symptoms

Sign and symptom	N=364	%
Fatigue	85	23.4
Running nose	72	19.7
Cough	87	23.9
Fever	41	11.2
Asymptomatic	30	8.2
Other signs and symptoms	23	6.3
Not declared	26	7.1

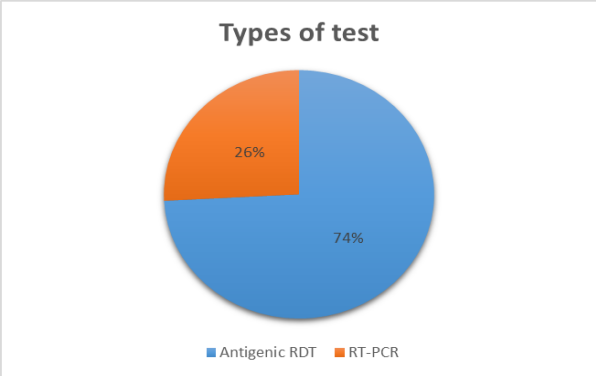

Figure 1. Test type rate

**Antegenic RDT= Antigenic Rapid Diagnostic Test ; *RT-PCR= Reverse Transcriptase Polymerase Chaine Reaction*

Antigenic Rapid Diagnostic test was the most used (74%).

Experiences of the study population

Self-Stigma Scale-Short (SSS), the Rosenberg Self-Esteem Scale and mental disorders/Depression, Anxiety and Stress scale (DDAS 21) used to describe the experiences of the study population reported medium levels of: self-esteem (53.0%), self-stigmatization (55%) and mental disorder (43%).

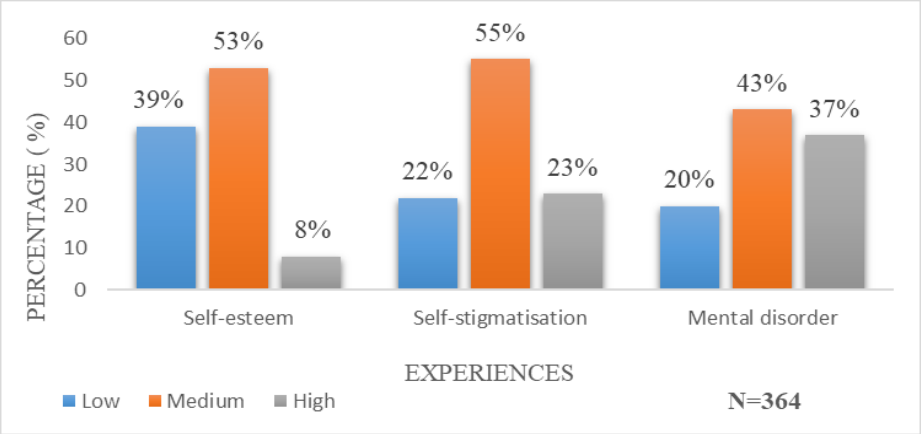

Figure 2. Level of experiences of the study population

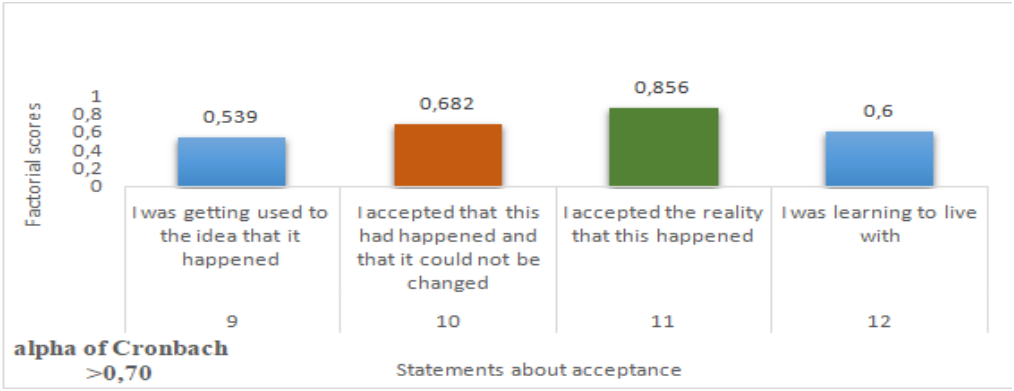

Figure 3. Proportion of COVID-19 patients according to acceptance

Table III. Distribution according to active and instrumental coping

Item	Statements about active and instrumental adaptation	Factorial score	alpha of Cronbach >0,70
1	I was feeling a lot of emotional distress and found myself expressing a lot of that feeling	0.586	0.74*
2	I tried to get advice from someone on what to do	0.796	
3	I spoke to someone to find out more about the situation	0,846	
4	I have spoken to someone who could do something concrete about the disease	0,722	
5	I asked people who had similar experiences what they did	0,825	
6	I was concentrating my efforts to do something about it	0,803	
7	I was taking extra measures to try to cope with the disease	0,745	
8	I was doing what needs to be done, one step at a time	0,590	

*satisfactory internal consistency at alpha de Cronbach>0,70

Coping strategies of the study population

Factor analysis confirmed that there were various forms of coping strategies among COVID-19 patients grouping certain behaviours classified into 33-item scale of coping strategies grouped around 7 factors: Active and Instrumental Coping, Acceptance, Suppression of Competing Activities, Religious Coping, Behavioral Disengagement, Use of Social Emotional Support and Mental Disengagement. All factors showed a satisfactory internal consistency (as Cronbach's alpha>0.70).

Active and instrumental coping

The statements: I spoke to someone to find out more about the situation (0,846), I asked people who had similar experiences what they did (0,825), I was concentrating my efforts to do something about it (0,803) were often used by COVID-19 patients (Table III).

Acceptance

From the responses, it was found that majority of the study population accepted the fact that it happened (0.856). Others accepted that it had happened and nothing could be changed (0.682).

Elimination of competing activities

I kept myself from being distracted by other thoughts or activities other than the illness (-0.464), was mostly reported amongsts the elimination of competing activities items (Table IV).

Table IV. Distribution according to elimination of competing activities

Items	Statements about elimination of competing activities	Factorial scores	alpha of Cronbach >0,70
13	I kept myself from being distracted by other thoughts or activities other than the illness	-0,464	0.74*
14	I was concentrating on treating this disease and, if necessary, let other things slide a bit	-0,927	
15	I think about the best way to deal with the problem	-0,842	

*satisfactory internal consistency at alpha de Cronbach>0,70

Table V. Distribution according to religious adaptation

Item	Statements about religious adaptation	Factorial score	alpha of Cronbach >0,70
16	I have put my trust in God	-0,676	0.71*
17	I sought God's help	-0,809	
18	I tried to find confort in my religion	-0,766	
19	I prayed more than usual	-0,596	

*satisfactory internal consistency at alpha de Cronbach>0,70

Religious adaptation

It appeared that as religious adaptation, COVID-19 patients prayed more than usual (-0.596), had put their trust in God (-0.676), tried to find confort in their religion (-0.766) and soughted God's help (-0.809). (Table V).

Behavioural disengagement

As regard to behavioural disengagement towards COVID-19 patients, the most reported situations where: I used alcohol or dugs to help me cope (0,715), I used alcohol or drugs to feel better (0,676), I would admit that I can't cope and stop trying (0,601). However, all other situations were reported. (Table VI).

Use of social emotional support

The statements: I received sympathy and understanding from someone(0,794), I was trying to get emotional support from friends or relatives (0,705), I was talking to someone about how I felt (0,657), were all used by COVID-19 patients.

Mental disengagement

I was thinking about something other than my illness (0,854), I would turn to work or other activities to take my mind off things (0,765),I slept more than usual (0,648),I prayed I was watching the networks (TV, internet, Facebook, WhatsApp, etc.) to think less about it (0,465) were reported situations.

COVID-19 patients at the Bertoua Regional Hospital showed a mixed coping strategy during their infection. Average scores were reported for mental disengagement (2.8 ± 0.84), active and instrumental adaptation (2.7 ± 0.86), as well as suppression of competing activity (2.6±0.84), thus were the most adopted coping strategies. Whereas, behavioral disengagement was by far the least adopted strategy (average = 1.7 ± 0.69) (Table VII).

Table VI. Distribution according to behavioural disengagement

Item	Statements about behavioural disengagement	Factorial score	alpha of Cronbach >0,70
20	I was laughing at the situation	0,441	0.52*
21	I used to make jokes about it	0,392	
22	I would admit that I can't cope and stop trying	0,601	
23	I gave up trying to get cured	0,592	
24	I was holding back from doing anything	0,194	
25	I used alcohol or drugs to feel better	0,676	
26	I used alcohol or dugs to help me cope	0,715	

Table VII. Highlighting the 7 factors with Cronbach's alpha coefficients

Factor	Dimension	Number of item	Moy ± sd	Alpha de Cronbach
1	Active and instrumental adaptation	8	2.7±0.86	0.93
2	Acceptance	4	2.2±0.84	0.85
3	Elimination of competing activities	3	2.6±0.84	0.79
4	Religious adaptation	4	2.3±0.94	0.89
5	Behavioural disengagement	7	1.7±0.69	0.85
6	Use of social emotional support	3	2.4±0.92	0.85
7	Mental disengagement	4	2.8±0.84	0.85
Total		33	2.4±0.58	0.93

Relationship between diagnosis, experiences and coping strategies of the study population

Socio-demographic characteristics and coping strategies

COVID-19 patients coping strategies is not significantly associated with any demographic characteristics (Table VII). The coping strategy of COVID-19 patients is significantly associated with the presence of signs and

symptoms. Overall, the presence of signs and symptoms increased the level of coping of COVID-19 patients. Specifically, the presence of signs and symptoms increased the level of active and instrumental coping (+)3.5, as well as religious coping (+)4.5. (Table IX).

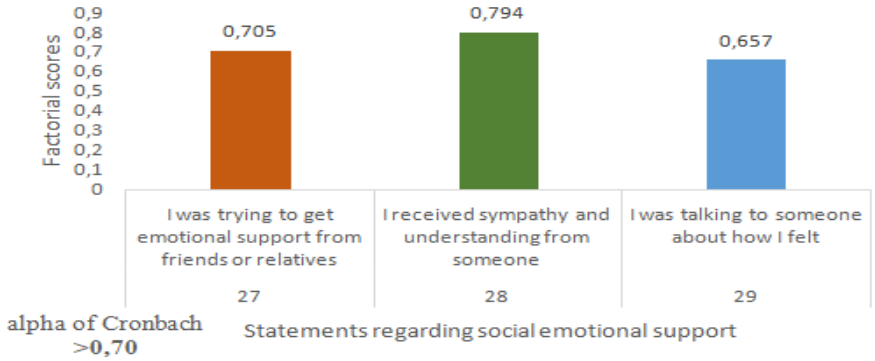

Figure 4. Proportion of COVID-19 patients according to social emotional support

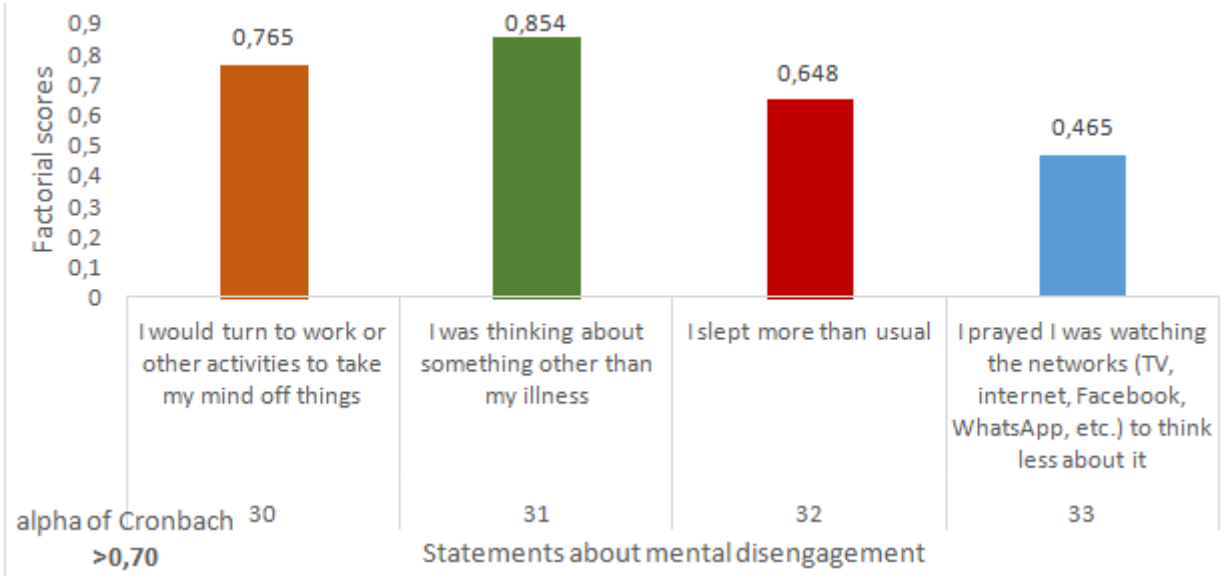

Figure 5. Proportion of COVID-19 patients according to Mental disengagement

Table VII. Fisher associated with the relationship between coping strategies and sociodemographic characteristics

Factor	Dimension	Age	Gender	Profession
1	Active and instrumental adaptation	0.72	0.95	0.64
2	Acceptance	0.13	0.23	0.67
3	Elimination of competing activities	0.24	0.74	0.74
4	Religious adaptation	0.55	0.82	0.02
5	Behavioural disengagement	0.46	0.54	0.73
6	Use of social emotional support	0.11	0.42	0.46
7	Mental disengagement	0.35	0.01	0.75
Total		0.80	0.77	0.82

**** significant at 1% ; ** significant at 5%.* Diagnosis and coping strategies

The relationship between experience and coping strategies after analysis reveals that, overall, self-esteem ((+)5,30***), self-stigmatisation ((+)5,7***), and mental disorders (anxiety, depression, and stress) ((+)6,84***) are significantly associated with coping in COVID-19 patients. Specifically, acceptance (-)10,27***, religious coping (+)6,55*** and behavioural disengagement (+)7,04*** were found to be significantly associated with self-esteem. While only suppression of competing activities (+)5,47*** and mental disengagement (+)13,46*** were significantly associated with self-stigmatisation. As for the relationship between mental

disorder and coping strategies, the data reveals that religious coping (+)3.25**, behavioural disengagement (+)7.20***, use of social emotional support (+)4.84*** and mental disengagement (+)8.96***are the only strategies significantly associated with mental disorder (Table X).

Table IX. Fisher associated with the relationship between coping strategies and diagnosis

Factor	Dimension	Signs and symptoms	Type of tests
1	Active and instrumental adaptation	(+)3.5***	0.77
2	Acceptance	1.2	0.96
3	Elimination of competing activities	0.7	0.41
4	Religious adaptation	(+)4.5***	0.32
5	Behavioural disengagement	1.5	0.11
6	Use of social emotional support	1.7	0.67
7	Mental disengagement	0.8	0.73
Total		(+)3.2***	0.27

*** *significant at 1% ; ** significant at 5%*; Experiences and coping strategies

Table X. Fisher associated with the relationship between coping strategies and experiences

Factor	Dimension	Self-esteem	Self-stigmatisation	Mental disorder
1	Active and instrumental adaptation	0.44	(+)7.97***	(+)11.84***
2	Acceptance	(-)10.27***	1.37	1.15
3	Elimination of competing activities	0.38	(+)5.47***	1.17
4	Religious adaptation	(+)6.55***	1.06	(+)3.25**
5	Behavioural disengagement	(+)7.04***	1.38	(+)7.20***
6	Use of social emotional support	2.92	0.24	(+)4.84***
7	Mental disengagement	0.18	(+)13.46***	(+)8.96***
Total		(+)5.30***	(+)5.7***	(+)6.84***

*** significant at 1% ; ** significant at 5%

DISCUSSION

Socio-demographic characteristics of the study population

The findings from our study shows that, of the 364 COVID-19 patients, the sex ratio was >1 in favor of men (with a rate of 61.1%). 37.0% were aged between 25 and 44 years old. This is close to that of Ndoue *et al*., [29] cross-sectional study with prospective data collection in 2020 on 1,003 COVID-19 patients in the Eastern region of Cameroon, who revealed that, the sex ratio was 0.71 in favor of men (with a rate of 61.32%) and the age group 20 to 40 years old was the most represented with a rate of 35%. This could be explained by the fact that the study was carried out in the same city. Also, of the 364 COVID-19 patients included in our study, some occupied a status other than healthcare workers (11.8%), and other professions such as traders, farmers and students (80.5). Our findings are different from those of Mbiaketcha *et al.*, [18] investigation at the Bafoussam Regional Hospital of Cameroon among hospitalized COVID-19 patients from March 2020 to December 2021 on 645 patients and revealed that 13,18% were Health professionals, 34.88% were not documented, 15.81% were housekeeper; 8.68% civil servants, 9.61% were pensioners, 6.36 students, 4.03% farmers, 1.55 self-employed and 0.78% were religious. This difference observed could be due to sample size difference which was larger in Mbiaketcha *et al.*, study compared to ours which included 364 COVID-19 patients.

Diagnosis of the study population

From our study, cough (23.9%), fatigue (23.4%) and running nose (19.7%) were the predominant signs and symptoms. This finding is similar to that of Choffor-Nchinda *et al.*, [17] cross-sectional hospital-based survey in Bertoua with consecutive sampling done, for two months on 203 participants amongst which, 98.5% of patients could state at least one symptom, with cough (93.6%) being the most accessed. This could be explained by the use of the same study area. In addition, Antigenic Rapid Diagnostic test was the most used (74%) from our findings. This is closer to Mbiaketcha *et al.*, [18] study who collected data from records of all patients who was tested positive for SARS-CoV-2 either by a RT-PCR or a RDT and was hospitalized at the COVID-19 case management unit at the BRH from March 2020 to December 2021. These results closeness might be because as years went on newly diagnostic test types of COVID-19 were developed.

Experiences of the study population

Self-Stigma Scale-Short (SSS), the Rosenberg Self-Esteem Scale and mental disorders/Depression, Anxiety and Stress scale (DDAS 21) used to describe the experiences of the study population reported medium levels of: self-esteem (53.0%), self-stigmatization (55%) and mental disorder (43%). Our findings is in agreement with that of Kouanfack *et al.*, [19] who reported that a total of 85.8% (115/134) of the participants had experienced at least one of the feelings of auto-stigmatization. The main manifestations of auto-stigmatization were feeling such as

being a burden on others (73.9%), feeling worthless (73.1%), guilt (67, 9%), fear of rejection (63.4%), self-censorship (34.3%) and feelings of shame (23.1%). At the hospital level, 20 respondents (15% of the study population) believed that they had been the victim of at least one act of stigmatisation from the medical staff. This stigma was manifested primarily by the feeling of being neglected as reported by 10.45% (14/134) of participants, feeling that staff was uncomfortable in the presence of the patient in 6% (8/134) and feeling of lack of respect for the patient-reported by about 2% (3/134). A participant reported that she/he was refused care. The presence of stigma by medical personnel was not associated with gender (P = 0.93), marital status (P = 0.45), presence of symptoms (P = 0.58). Also, our results were different from those of Azmi *et al*., [39] in Saudi Arabia whose results revealed that a total of 41% of students experienced low self-esteem (38% females and 45% males). Thou made used of the Rosenberg (Self-Esteem Scale) as us, this difference could rely on the fact that the study population was less (151) than ours (364).

Coping strategies of the study population

Factor analysis confirmed that there are various forms of coping strategies among COVID-19 patients grouping certain behaviours classified into 33-item scale of coping strategies grouped around 7 factors: Active and Instrumental Coping, Acceptance, Suppression of Competing Activities, Religious Coping, Behavioural Disengagement, Use of Social Emotional Support and Mental Disengagement. All factors showed a satisfactory internal consistency (as Cronbach's alpha>0.70). The statements: I spoke to someone to find out more about the situation (0,846), I asked people who had similar experiences what they did (0,825), I was concentrating my efforts to do something about it (0,803), it was found that majority of the study population accepted the fact that it happened (0.856). Others accepted that it had happened and nothing could be changed. We further had responses like: I kept myself from being distracted by other thoughts or activities other than the illness (-0.464), It appeared that as religious adaptation, COVID-19 patients prayed more than usual (-0.596), had put their trust in God (-0.676), tried to find comfort in their religion (-0.766) and soughted God's help (-0.809). I used alcohol or drugs to help me cope (0,715), I used alcohol or drugs to feel better (0,676), I would admit that I can't cope and stop trying (0,601). I received sympathy and understanding from someone (0,794), I was trying to get emotional support from friends or relatives (0,705), I was talking to someone about how I felt (0,657), were all used by COVID-19 patients. I was thinking about something other than my illness (0,854), I would turn to work or other activities to take my mind off things (0,765), I slept more than usual (0,648), I prayed I was watching the networks (TV, internet, Facebook, WhatsApp, etc.) to think less about it (0,465) were reported situations. COVID-19 patients at the Bertoua Regional Hospital showed a mixed coping strategy during their infection. Average scores were reported for mental disengagement (2.8 ± 0.84), active and instrumental adaptation (2.7 ± 0.86), as well as suppression of competing activity (2.6±0.84), thus were the most adopted coping strategies. Whereas, behavioural disengagement was by far the least adopted strategy (average = 1.7 ± 0.69) (table VII).

Our findings are similar to that carried out in Bangladesh where by the Bangladeshi respondents showed a mixed coping strategy during the first wave of COVID-19. Higher scores were reported for approach coping strategies (APC) (29.83 ± 8.9; Range: 12–48); avoidance coping strategies (AVC) was reported at lower levels overall (20.83±6.05; Range: 12–48). Humour (HU) scores were reported at 2.68±1.3 (2–8 scoring scale), and religion (RE) scores were reported at 5.64 ± 1.8 (2 to 8 scoring scale). demonstrates that, among the respondents having the AVC style, 84.7% had a 2–3 score related specifically to mild to moderate substance use. The same group also reported similar scores for denial (72.4%), behavioural disengagement (61.4%), and self blames (67.3%). Respondents with APC style had more scores of 6 to 8 (medium amount to all-time) related to inactive coping (45.3%), emotional support (37.2%), use of information support (35.5%), positive reframing (36.6%), planning (34%) and acceptance (55.1%). From the cluster sample, 24.5% of Bangladeshi respondents coped with the COVID-19 pandemic "all the time", and 30.8% coped "the majority of the time" based on religious belief during the pandemic time frame for this study [22].

Relationship between diagnosis, experiences and coping strategies of the study population

The coping strategy of COVID-19 patients was significantly associated with the presence of signs and symptoms. Overall, the presence of signs and symptoms increased the level of coping of COVID-19 patients. Specifically, the presence of signs and symptoms increased the level of active and instrumental coping (+)3.5, as well as religious coping (+)4.5. Elsewhere, the relationship between experience and coping strategies after analysis revealed that, overall, self-esteem ((+)5,30***), self-stigmatisation ((+)5,7***), and mental disorders (anxiety, depression, and stress) ((+)6,84***) are significantly associated with coping in COVID-19 patients. Specifically, acceptance (-)10,27***, religious coping (+)6,55*** and behavioural disengagement (+)7,04*** were found to be significantly associated with self-esteem. While only suppression of competing activities (+)5,47*** and mental disengagement (+)13,46*** were significantly associated with self-stigmatisation. As for the relationship between mental disorder and coping strategies, the data revealed that religious coping (+)3.25**, behavioural disengagement (+)7.20***, use of social emotional support (+)4.84*** and mental disengagement (+)8.96*** were the only strategies significantly associated with mental disorder.

Hossain *et al.*, [54] in Bangladesh initiated a prospective, cross-sectional survey of adults living in Bangledesh, to explore coping strategies used by Bangladeshi citizens during the major wave of the COVID-19 pandemic. Participants were interviewed for socio-demographic data and completed the Bengali-translated Brief-COPE Inventory. COPING indicators were categorized in four

ways, such as approach, avoidant, humour, and religion. Higher scores were reported for approach coping styles, with lower scores reported for avoidant coping styles. Humour coping scores were re-ported, and religion coping scores. Both men and women showed similar coping styles. The respondents who had COVID-19 like symptoms had a relationship with AVC ($p < 0.01$), APC ($p < 0.01$), and RE ($p < 0.05$). Respondents who experienced COVID-19 like symptoms also showed a significant difference from asymptomatic respondents concerning AVC ($p < 0.01$). The explanatory factor analysis revealed two major factors that were strongly associated with the coping items. Factor 1 was defined as approach coping and found an eigen value of 5.645 (>1.14), and factor 2 was defined as avoidant coping and found an eigen value of 3.010 (>1.14); other factors were not found eligible. In the principal component analysis, the coping items found two clusters with a significant positive correlation which means approach coping styles (eigenvalue 5.645 > 1.14), was associated with self-distraction (0.739), venting (0.670), active coping (0.771), seeking emotional support (0.800), seeking information support (0.833), positive reframing (0.753), planning (0.759), acceptance (0.556), and religion (0.635). Factor 2, avoidant coping (eigenvalue 3.010 > 1.14), was associated with denial (0.659), substance use (0.716), behaviour disengagement (0.580), self-blame (0.616), and humour [23].

CONCLUSION

Globally, the study found that most COVID-19 patients were aged 25 to 44, predominantly male, and traders. The majority experienced symptoms such as cough, fatigue, and runny nose, with Antigenic Rapid Diagnostic Tests (Ag-RDT) being the most common diagnostic method. Patients reported moderate levels of self-esteem, self-stigmatization, and mental disorders. The most adopted coping strategies were mental disengagement, active and instrumental adaptation, and suppression of competing activities. Religious coping and active/instrumental coping increased with the presence of symptoms. Self-esteem, self-stigmatization and mental disorders were significantly associated with COVID-19 patients. Specifically, acceptance, religious coping and behavioral disengagement were found to be significantly associated with self-esteem. Suppression of competing activities and mental disengagement were significantly associated with self-stigmatization. Religious coping, behavioral disengagement, use of social emotional support, and mental disengagement were significantly associated with mental disorders.

Limitations of the study

The study faced several challenges: the absence of pre-pandemic data on coping strategies, incomplete socio-demographic information, survey inconsistencies, lack of instruments to assess coping strategies concisely during pandemic context and difficulties in scheduling interviews with up to 364 COVID-19 patients. To address these issues, the, Self-Stigma Scale-Short (SSS); Rosenberg Self-Esteem Scale; Depression, Anxiety and Stress Scale (DDAS 21) and Carver COPE scale were used.

Conflict of interests

None

Authors Contributions

Conception and design of study: Mvong Vendeline Amaelle Goretti, Innocent TAKOUGANG. Analysis and interpretation of data: NANA MBEZOU Audrey Inna, LONLA NZOUGOUAT Joel. Drafting the manuscript: MVONG Vendeline Amaelle Goretti, SOULEYMANE SÉKOU Diarra, TIAMA Jean Marc Léré. Approval of the version of the manuscript to be published: All authors have read and agreed to the final manuscript.

Acknowledgments

We acknowledge the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I, for all the support provided to implement this project. We also express our gratitude to the Eastern Regional Delegation of Public Health and the Bertoua Regional Hospital for giving us access to investigate on their premises and all the participants who took part in this study.

REFERENCES

1. World Health Organisation (WHO). Coronavirus disease (COVID-19) [Inter-net]. Geneva Switzerland: World Health Organisation Health Emergency Dash-board; 2023 [updated 2023; cited 2023 April 12]. Available from: https://www.who.int/health-topics/coronavirus.
2. Cennimo DJ, Coronavirus Disease 2019(COVID-19) Clinical presentation. Med-scape. 2023 Apr 6. https://emedicine.medscape.com/article/2500114-clinical
3. Shen M, Zhou Y, Ye J, Al-Maskri AA, Kang Y, Zeng S, et al. Recent advances and perspectives of nucleic acid detection for coronavirus. Journal of Pharmaceutical Analysis. 2020 March 1; 10: 97–101.
4. World Health Organisation (WHO). Situation and Reponse in the WHO AFRO Re-gion. COVID-19 Response in Africa Bulletin. 2023 Febuary; Issue 10: p. 1-23. Available from: https://www.afro.who.int/sites/default/files/202303/Final_Dec_Feb23_COVID-19%20Bulletin_AFRO.pdf.
5. World Health Organisation (WHO). Coronavirus disease (COVID-19) [Inter-net].Geneva Switzerland: World Health Organisation Health Emergency Dash-board; 2023 [updated 2023; cited 2023 April 19]. Available from: https://covid19.who.int/region/afro/country/cm.
6. Public Health Emergency Operations Coordination Center (PHEOCCP/MOH). Cameroon Covid-19 Situation Report No 171 [Internet]. Cameroon: Public Health Emergency Operations Coordination Center; 2023 [updated 2023; cited 2023 March 8]. https://www.ccousp.cm/download/cameroon-covid-19-situation-report-n171/.
7. Sanushka N, Gitaka J, Suliman S, Baptista S, Oyedemi MB, Nepolo E, Enany S. Coronavirus Disease 2019 Diagnostics: Key to Africa's Recovery. DNA and Cell Biology. 2022 Jan 12; 41(1): 30-33.
8. World Health Organisation. Antigen-detection in the diagnosis of SARS-CoV-2 infection. Interim guidance. 2021 October 6; WHO/2019-nCoV/Antigen_Detection/2021.1.
9. Page M, Almond N, Rose NJ, Schneider CK. Diagnostics and the coronavirus: don't let the standards slip. Nat Biotechnol. 2020 may 22; 38: 673–674.

10. Hellou MM, Gorska A, Mazzaferri F, Cremonini E, Gentilotti E, De Nardo P, et al. Nucleic-acid-amplification tests from respiratory samples for the diagnosis of coronavirus infections: systematic review and meta-analysis. Clin Microbiol In-fect. 2020 nov 11; 27(3): 341–351.
11. Tejiokem Mathurin Cyrille , Sadeuh-Mba Serge , Tchatchueng Mbougwa Jules Brice , Tagnouokam Ngoupo Paul Alain , Ngondi Grace , Fokam Joseph , Hamadou Achta , Nke Gisele , Nwobegahay Julius , Tongo Marcel , ` Sander Melissa , Ndip Lucy , Perraut Ronald , Okomo Assoumou Marie Claire , Pefura Yone Eric Walter , Etoundi Mballa Georges Alain , Njouom Richard , Eyangoh Sara , Clinical presen-tation of the Coronavirus disease 2019 at the time of testing and associated factors to presymptomatic cases in Cameroon, IJID Regions (2022), doi: https://doi.org/10.1016/j.ijregi.2022.05.010
12. Guy Pascal Ngaba et al. Evaluation de deux tests de diagnostic antigénique du COVID-19: BIOSYNEX® COVID-19 Ag BSS et BIOSYNEX ® COVID-19 Ag+ BSS comparés à la PCR AmpliQuick® SARS-CoV-2 . Pan African Medical Jour-nal. 2021;39(228).10.11604/pamj.2021.39.228.30752
13. Shen M, Zhou Y, Ye J, Al-Maskri AA, Kang Y, Zeng S, et al. Recent advances and perspectives of nucleic acid detection for coronavirus. Journal of Pharmaceutical Analysis. 2020 March 1; 10: 97–101.
14. Ahmadi S, Jorjoran Shushtari Z, Shirazikhah M, Biglarian A, Irandoost SF, Paykani T et al. Social determinants of adherence to COVID-19 preventive guide-lines in Iran: a qualitative study. INQUIRY: The Journal of Health Care Organiza-tion, Provision, and Financing. 2022 Rhag 1;59. Epub 2022 Maw 29. doi: 10.1177/00469580221084185
15. AlKuwaiti M, Hamada BA, Aljneibi N, Paulo MS, Elbarazi I. The Effect of COVID-19 Diagnosis on the Physical, Social, and Psychological Well-Being of People in the United Arab Emirates: An Explorative Qualitative Study. Front. Pub-lic Health. 2022 May 26; 10: 866-078.
16. Ndoue MG, Sandra LN, Placide AA, Steve AA, Dorine AM, Danielle FM, et al. Epidemiological profile of covid19 infection and assessment of knowledges and practices of its barrier measures by the population from the East Cameroon Re-gion. Journal of Medecine and Health. 2020 October 16; 5(1): 36-46.
17. Choffor-Nchinda E, Atanga LC, Fokouo FJV, Nyada FB, Me-Meke GP. COVID-19 Knowledge, Attitude and Practice One Year after: A Study of Adults from Ear-Nose-Throat Departments of Cameroon. Health Sci. Dis. 2021 July; 22(7): 52-57.
18. Mbiaketcha NIS, Buh NC, Tchio-Nighie KH, Njoudap M, Nguegoue TF, Ateudjieu J. Chronic diseases and mortality among hospitalised COVID-19 patients at Bafoussam Regional Hospital in the West region of Cameroon. PLOS Glob Public Health . 2023 Febuary23; 3(2): e0001572.
19. Kouanfack C, Kuathe K, Zemsi S, Edingue A, Youm E, Nangmo A, Effect of stig-ma on COVID-19 cases management at the treatment unit of Yaounde Central Hospital, Cameroon. Niger Health Sci. 2022; 22: 51-5.
20. Haddad C, Bou Malhab S, Malaeb D, Sacre H, Saadeh D, Mourtada V, Salameh P. Stigma toward people with COVID-19 among the Lebanese population: a cross-sectional study of correlates and mediating effects. BMC Psychol. 2021 Oct 22;9(1):164.
21. Azmi FM, Khan HN, Azmi AM, Yaswi A, Jakovljevic M. Prevalence of COVID-19 Pandemic, Self-Esteem and Its Effect on Depression among University Students in Saudi Arabia. Front. Public Health. 2022 February; 10: 836-688.
22. Oker K, Reinhardt M, Schmelowszky Á. Effects of COVID-19 on Mental Health and Its Relationship With Death Attitudes and Coping Styles Among Hungarian, Norwegian, and Turkish Psychology Students. Front. Psychol. 2022 Febuary 7; 13: 812-720.
23. Hossain KMA, Shafin R, Yeasmin MH, Jahid IK, Hossain MA, Rana S, Kabir MF, Chokrovorty SK, Faruqui R. Community Coping Strategies for COVID-19 in Bangladesh: A Nationwide Cross-Sectional Survey. COVID 2023. 2023March 3; 3:320–335N, Howlett W, et al. Neurosyphilis in Africa: A systematic review. PLoS Negl Trop Dis 2017; 11: e0005880.