

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	SARS-CoV-2 seroprevalence and living conditions in Bamako (Mali): a cross-sectional multistage household survey after the first epidemic wave, 2020
AUTHORS	Gaudart, Jean; Cissoko, Mady; Landier, Jordi; Kouriba, Bourema; Sangare, Abdoul; Katilé, Abdoulaye; Djimde, Abdoulaye A.; Berthé, Ibrahima; Traore, Siriman; Thera, Ismaila; Hadiata, Maiga; Sogodogo, Elisabeth; Coulibaly, Karyn; Guindo, Abdoulaye; Dembele, Ousmane; Sanogo, Souleymane; Doumbia, Zoumana; Dara, Charles; Altmann, Mathias; Bonnet, Emmanuel; Balique, Hubert; Sagaon-Teyssier, Luis; Vidal, Laurent; Sagara, Issaka; Bendiane, Marc-Karim

VERSION 1 – REVIEW

REVIEWER	Patrick, Sean Faculty of Health Sciences University of Pretoria
REVIEW RETURNED	31-Oct-2022

GENERAL COMMENTS	<p>This paper is the first report of the SARS CoV-2 seroprevalence and living conditions in Bamako, Mali. The paper is well-presented and highlights the potential underreporting of COVID-19 in Mali.</p> <p>General There are minor grammatical errors that need to be rectified.</p> <p>Abstract Line 41-42: Write out the number 3. Revise sentence structure, suggestion: We conducted a cross-sectional multistage household survey during September 2020, in three neighborhoods of the commune VI (Bamako), where 30% of the cases were reported.</p> <p>Line 65: replace “not matter” with regardless of”</p> <p>Methods Line 205, 208 and 210: replace with word “concerning” with “regarding”</p> <p>Was the questionnaire administered in English or French? Some of the Likert scales such as very agreed is not grammatically correct in English. If this is a direct translation from French, then the correct term in English would be strongly agreed.</p> <p>Results Line 316: Replace the word “deleterious” with poor</p> <p>Regarding the classification of the profiles. The authors should consider the following:</p>
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	<p>Poor Small Family = Low Income Small Family (LISF) Poor Large Family = Low Income Large Family (LILF) Rich Family = High Income Family (HIF)</p> <p>Line 357: Correct grammar: ...opinion was shared more among men...</p> <p>Line 366: Replace “whatever” with “regardless”</p> <p>Table 5: Consider using “correct” instead of “success” Table 6a and 6B can be merged. The two age groups from table 6b can be added to 6a to avoid repeating an entire table.</p> <p>Discussion Line 420: 1rst should be 1st and 24 should be 24th The opening paragraph alludes to possible underreporting of Covid-19 cases in Mali. What is missing from the discussion is the implication for pandemic preparedness. The discussion would benefit from a paragraph on the health system in Mali that may have contributed to the underreporting, which would serve as a discussion point for improving early case detection and treating strategies in future.</p>
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REVIEWER	Mohsenpour, Amir Universität Bielefeld, Population Medicine and Health Services Research (AG2)
REVIEW RETURNED	06-Nov-2022

GENERAL COMMENTS	<p>Many thanks to the authors for this manuscript complementing the existing literature by evidence from low-income settings. The findings may inform both the current (still ongoing) pandemic as well as be important for future ones.</p> <p>In general, I find the manuscript well-written with an introduction leading to the importance of the research questions, a clear outline of the methodology to potentially allow reproduction and interesting to-read findings.</p> <p>I only have a few minor recommendations:</p> <ul style="list-style-type: none"> - the manuscript would benefit from a quick language proofreading (e.g. lines 49, 65, 149, 165, 205 and 443), if I am not mistaken. - The abbreviation "M6" (line 102) is unexplained - The abbreviation KABP is used in lines 202 and 269 before being introduced later in line 348 - Table 1 could be complemented by rows depicting the total number per each characteristic - Figure 3 could improve by adding clear titles to each column, with measure of unit (years) <p>Further, it was unclear how easily the identified prevalence can be extrapolated to the full city of Bamako. Age and sex have been considered in this process, but e.g. not socioeconomic status, despite the authors finding an aOR of 1.76 for RF (though slightly not statistically significant given 0.06).</p> <p>On the other hand, I enjoyed the authors integrating community health workers into their field investigation teams and organizing public feedback meetings. They additionally discussed the role of gender in the prevalence differences and offered a literature-based</p>
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	<p>comparison with other similar African cities in regard of the identified prevalence.</p> <p>Altogether, I recommend the publication after minor revision.</p>
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REVIEWER	Warszawski, Josiane CESP, CESP - Public Health
REVIEW RETURNED	08-Nov-2022

GENERAL COMMENTS	<p>This paper aims to estimate SARS-Cov2 seroprevalence in septembre 2020 in general population of the most populated and affected commune of Bamako which accounted for 50% of the Covid-19 cases reported in Mali in september 2020 The objective was also to study living conditions, health behavior and knowledges associated with SARS-Cov-2 seropositivity.</p> <p>Comments</p> <p>The study was conducted using a probability household cross sectional survey. There is few studies using a random sampling survey to estimate the Covid-19 seroprevalence in general population, especially in low income setting. The main result pointed out the high gap between the seroprevalence estimated from this study (16.4%) corresponding to an estimate of 400000 cases, and the low proportion of cases officially reported (0.4%). Sample design, data collection, and statistical methods are well described and adapted to the objective.</p> <p>However, the plan and the presentation of results and tables are not totally clear according to the objective and conclusion, and may be improved.</p> <p>Major points: Summary; add 95%CI to the seroprevalence estimate.</p> <p>Table 1: It describes some demographic characteristics of the study participants, which had poor interest if not compared with the distribution of the general population of Bamako, in order to evaluate potential participation bias, as the study aims here to produce representative estimation. The status of SARS-Cov2 and detailed IgM and IgG are sufficiently described in the text, and % of covid-19 in Table 1 are also redondant with those presented in table 2.</p> <p>Table 2: 95%CI should be added to each estimates of prevalence and total. Are "adjusted" prevalence estimated using direct standardization? Indicate how 95%CI are estimated, according to the sampling design, to take into account household clustering design effect.</p> <p>The section "household profile as social proxy" should be moved from the result section to the method section, as it presents methodologic issue concerning one exposure variable of interest. The Table 3 may be referred as supplementary information. In that table, PSF is indicated as the ref category, but p-value compared PSF and RF to "PLF" which then appeared as the ref category?</p> <p>In the section "Factors associated with SARS-CO2-Seropositivity", seropositivity % should be presented with 95%CI in the Table 4. It would be interesting to present estimates of seroprevalence among age classes. Is there a linear increasing rate with age ?</p>
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	<p>The section KABP is only partially related to the objective. It corresponds to a descriptive analysis of KABP without any analysis of the relation with seropositivity. It is also unclear why knowledges are presented overall and attitudes and practices compared by gender among age categories.</p> <p>Discussion: several results are discussed without having being presented, such as a higher seropositivity in 20-40 years age group whereas it was only reported in “result section” as associated with older age, and such as relation between symptoms and seropositivity.</p> <p>It is written than “young people were less exposed than older despite the higher level of risk practices”, but the authors may compare seropositivity according to high and low risk practices. Moreover, young people may have been similarly exposed but less infected during the first wave.</p> <p>It is written than "gender differences in outcomes remain problematic". This term is not totally adequate as it can refer both to the potentiel selection bias or to specific gender vulnerabitly. This should be clarified</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Sean Patrick, Faculty of Health Sciences University of Pretoria

Comments to the Author:

This paper is the first report of the SARS CoV-2 seroprevalence and living conditions in Bamako, Mali. The paper is well-presented and highlights the potential underreporting of COVID-19 in Mali.

General

There are minor grammatical errors that need to be rectified.

Abstract

Line 41-42: Write out the number 3. Revise sentence structure, suggestion: We conducted a cross-sectional multistage household survey during September 2020, in three neighborhoods of the commune VI (Bamako), where 30% of the cases were reported.

We agreed with your proposition, and we changed this sentence (see lines 41:42):

“We conducted a cross-sectional multistage household survey during September 2020, in three neighborhoods of the commune VI (Bamako), where 30% of the cases were reported.”

Line 65: replace “not matter” with regardless of”

We replaced “not matter” by “regardless of” (see line 65)

Methods

Line 205, 208 and 210: replace with word “concerning” with “regarding”

We replaced “concerning” by “regarding” (see lines 209, 212 and 214):

“The current at-risk practices have been measured using a four bipolar Likert Items on practices during the seven past days assessing: wearing mask when not at home, washing hands with soap, going to crowded areas during the day or the night. Regarding behavior questions, six bipolar Likert Items (from systematically/very often to never) on behavior changes since the start of the epidemic focusing on: washing hands, visiting friends and relatives, going to crowded areas, touching each other, sneezing into elbow, reducing travel. Regarding knowledge questions, a scale-score based on 13 items (True/False/Don't know) on prevention, treatment, symptoms, and transmission of SARS-CoV-2 has been build up. At least, regarding cultural beliefs, four bipolar Likert Items (from very agreed to very disagreed) assessed opinion about the disease focusing on infection origin: a divine punishment, a spell casting, a white people illness, a way to get money for rich people.”

Was the questionnaire administered in English or French? Some of the Likert scales such as very agreed is not grammatically correct in English. If this is a direct translation from French, then the correct term in English would be strongly agreed.

The questionnaire was administered in French and local language.

We changed “very agreed” by “strongly agreed” all in the manuscript. (see lines 214:215):

“The current at-risk practices have been measured using a four bipolar Likert Items on practices during the seven past days assessing: wearing mask when not at home, washing hands with soap, going to crowded areas during the day or the night. Concerning behavior questions, six bipolar Likert Items (from systematically/very often to never) on behavior changes since the start of the epidemic focusing on: washing hands, visiting friends and relatives, going to crowded areas, touching each other, sneezing into elbow, reducing travel. Concerning knowledge questions, a scale-score based on 13 items (True/False/Don't know) on prevention, treatment, symptoms, and transmission of SARS-CoV-2 has been build up. At least, concerning cultural beliefs, four bipolar Likert Items (from strongly agreed to strongly disagreed) assessed opinion about the disease focusing on infection origin: a divine punishment, a spell casting, a white people illness, a way to get money for rich people.”

Results

Line 316: Replace the word “deleterious” with poor

We changed “deleterious” by “poor” (see line 313)

Regarding the classification of the profiles. The authors should consider the following:

Poor Small Family = Low Income Small Family (LISF)

Poor Large Family = Low Income Large Family (LILF)

Rich Family = High Income Family (HIF)

We have inserted the proposed definitions for clarification and modified the different sections in accordance.

Line 357: Correct grammar: ...opinion was shared more among men...

We have corrected the manuscript (see line 360-361)

“This last opinion was shared more among men than women (33.6% vs 26.2%, $p=0.01$)”

Line 366: Replace “whatever” with “regardless”

We have corrected the manuscript (see line 370)

“Regarding results displayed by age and sex (table 5), the youngest participants were more reluctant to change their daily behaviors regardless their gender”.

Table 5: Consider using “correct” instead of “success”

We have corrected the table (now table 4)

Table 6a and 6b can be merged. The two age groups from table 6b can be added to 6a to avoid repeating an entire table.

We merged both tables as recommended (now table 5).

Discussion

Line 420: 1rst should be 1st and 24 should be 24th

We corrected the line 411 in accordance

The opening paragraph alludes to possible underreporting of Covid-19 cases in Mali. What is missing from the discussion is the implication for pandemic preparedness. The discussion would benefit from a paragraph on the health system in Mali that may have contributed to the underreporting, which would serve as a discussion point for improving early case detection and treating strategies in future.

We make the correction (see lines 411:412)

“Indeed, 3,258 new cases were officially reported at the Bamako district (and 172 new deaths) between November 1st 2020 and January 24th 2021. The availability of diagnostic tests and trained staff improved reporting over time.”

We added three paragraphs in the discussion (see lines 459:474)

“The pandemic response plan in Mali was to send suspected cases to small number of testing and care centers, leading to a massive influx of patients. Indeed, in Bamako, only 2 health centers were dedicated to patient testing and care (Hopital du Point G and Hopital du Mali), with hospitalization of all confirmed cases, both symptomatic and asymptomatic. These 2 hospitals were rapidly overwhelmed, leading to a deterioration in the quality of care. Furthermore, at the beginning of the epidemic, the presence of health workers with white suits at patient homes stigmatized households. This created a denial reaction of the population to the disease.

As a result of our work, the circulation of the virus was higher than reported. As a lesson learned from the epidemic, we recommend to strengthen the involvement of community health workers. These workers would be able to play a role in raising awareness among the population about preventive measures and directing patients and contact cases to diagnostic centers, including safe transportation of suspected COVID-19 cases. Only confirmed cases would receive appropriate care, according to clinical condition. Only severe cases would be referred to health centers. Confirmed asymptomatic and pauci-symptomatic cases would be isolated at home with regular follow-up by community health workers. The health professionals would then supervise the community health workers and would focus on severe cases.”

Reviewer: 2

Dr. Amir Mohsenpour, Universität Bielefeld

Comments to the Author:

Many thanks to the authors for this manuscript complementing the existing literature by evidence from low-income settings. The findings may inform both the current (still ongoing) pandemic as well as be important for future ones.

In general, I find the manuscript well-written with an introduction leading to the importance of the research questions, a clear outline of the methodology to potentially allow reproduction and interesting to-read findings.

I only have a few minor recommendations:

- the manuscript would benefit from a quick language proofreading (e.g. lines 49, 65, 149, 165, 205 and 443), if I am not mistaken.

The whole manuscript has been proofread by a professional scientific reader to consider typing errors.

- The abbreviation "M6" (line 102) is unexplained

M6 refers to 6 months after the onset of the epidemic. We remove this unnecessary abbreviation since it is redundant with the indication of the month-year considered. This sentence now reads (see lines 102:103)

“Among the cases recorded in September 2020, ~50% were reported in the district of Bamako i.e. 1,532 reported cases, for a population of at least 2.42 million inhabitants.”

- The abbreviation KABP is used in lines 202 and 269 before being introduced later in line 348

We changed the text in accordance (see line 206)

“Knowledges, attitudes, behaviors, practices outcomes measures”

- Table 1 could be complemented by rows depicting the total number per each characteristic

According to Reviewer 3 comment, we have removed the Table 1, now in appendix A1, including this correction.

- Figure 3 could improve by adding clear titles to each column, with measure of unit (years)

We have corrected the figure as recommended (see figure 3)

Further, it was unclear how easily the identified prevalence can be extrapolated to the full city of Bamako. Age and sex have been considered in this process, but e.g. not socioeconomic status, despite the authors finding an aOR of 1.76 for RF (though slightly not statistically significant given 0.06).

The main objective for our extrapolation to the entire capital city population was to compare the order of magnitudes between observed infections through testing facilities and expected infections based on seroprevalence. Given the differences between age groups, we needed to account for the differences between the age and sex structure of our sample compared to the population of Bamako. We do not have socio-economic data of the population of Bamako which would allow to integrate this dimension. Even if our extrapolation may be biased by the lack of socio-economic information, as noted by the reviewer, we consider, however, that accounting for age and sex is sufficient to demonstrate our point on the large gap between recorded cases and actual infections.

On the other hand, I enjoyed the authors integrating community health workers into their field investigation teams and organizing public feedback meetings. They additionally discussed the role of gender in the prevalence differences and offered a literature-based comparison with other similar African cities in regard of the identified prevalence.

Thank you for your comment. According to your comment, as well as the Reviewer 1 and 3 comments, we added a paragraph in the discussion section to reinforce the importance of community health workers at the frontline for screening, prevention and caregivers.

Altogether, I recommend the publication after minor revision.

Reviewer: 3

Dr. Josiane Warszawski, CESP, Universite Paris-Saclay, APHP

Comments to the Author:

This paper aims to estimate SARS-Cov2 seroprevalence in septembre 2020 in general population of the most populated and affected commune of Bamako which accounted for 50% of the Covid-19 cases reported in Mali in september 2020. The objective was also to study living conditions, health behavior and knowledges associated with SARS-Cov-2 seropositivity.

Comments

The study was conducted using a probability household cross sectional survey. There is few studies using a random sampling survey to estimate the Covid-19 seroprevalence in general population, especially in low income setting. The main result pointed out the high gap between the seroprevalence estimated from this study (16.4%) corresponding to an estimate of 400000 cases, and the low proportion of cases officially reported (0.4%).

Sample design, data collection, and statistical methods are well described and adapted to the objective.

However, the plan and the presentation of results and tables are not totally clear according to the objective and conclusion, and may be improved.

Major points:

Summary; add 95%CI to the seroprevalence estimate.

We have now add 95%CI in the abstract (see lines 55):

“The prevalence of SARS-CoV-2 seropositivity was 16.4% (95%CI: 15.1-19.1) after adjusting on the population structure.”

Table 1: It describes some demographic characteristics of the study participants, which had poor interest if not compared with the distribution of the general population of Bamako, in order to evaluate potential participation bias, as the study aims here to produce representative estimation. The status of SARS-Cov2 and detailed IgM and IgG are sufficiently described in the text, and % of covid-19 in Table 1 are also redondant with those presented in table 2.

According to your comment, we have removed the Table 1, now in appendix A1.

Table 2: 95%CI should be added to each estimates of prevalence and total. Are “adjusted” prevalence estimated using direct standardization? Indicate how 95%CI are estimated, according to the sampling design, to take into account household clustering design effect.

We sampled households using an adaptation of the random walk method. This design is considered approximately self-weighting. Following the reviewer’s suggestion, we re-estimated the variance for the crude prevalence estimates (overall in the new Table 1, and by age and sex in figure 3) accounting for clustering at household level using the estimation formula proposed by Milligan et al [14]. We also added confidence intervals in the new table 3.

		N= [95% confidence interval]	Prevalence (%) [95% confidence interval]
SARS-CoV-2 serological status	positive	227	17.1% [13.7-20.5]
	negative	1,100	
Population (inhabitants in 2020)		2,420,000	
COVID-19 in Bamako	Cases, reported after confirmation*	1,532	0.07%
	Infections, estimated	397,321 [192,452-602,183]	16.4% [8.0-24.9]
Mortality	Deaths, reported*	81	0.003%
	Deaths, estimated based on infections	1,725 [476-2,970]	0.07% [0.02-0.12]
* reference: COVID-19 in Mali situation report n°121 (21-27 September 2020), Ministry of Health, Mali			

The section “household profile as social proxy” should be moved from the result section to the method section, as it presents methodologic issue concerning one exposure variable of interest.

We have added a more descriptive line in the method section as you recommended (see lines 178:180).

“Assessing social characteristics and housing conditions, three specific profiles have been determined. To determine household profile as social proxy the Location and family structure; Goods and incomes and Housing conditions were used”

Nevertheless, the first paragraphs of the “household profile as social proxy” section, within the “result” section”, presents the results of the performed classification. For this reason, we have not removed this section.

The Table 3 may be referred as supplementary information. In that table, PSF is indicated as the ref category, but p-value compared PSF and RF to “PLF” which then appeared as the ref category?

In the new table 2, the last two columns correspond to subgroup analyses for which a Bonferroni correction was applied. We have added this precision in the new table 2.

In the section “Factors associated with SARS-CO2-Seropositivity”, seropositivity % should be presented with 95%CI in the Table 4.

In this table, we are presenting univariate odds ratio (accounting for the multilevel sampling design) and multivariate adjusted odds-ratios. We presented numbers and % in each category to provide an insight on rare or frequent factors, and added 95%CI in the new table 3.

		SARS-CoV-2 serology	
		Neg (n=)	Pos ; n= (% [95%CI])
Sex	Male	456	67 12.8% [9.0-16.6]
	Female	644	160 19.9% [15.2-24.6]
Age		16 (9-25)*	18 (11-30)*
Household profile	PSF	304	54 15.1 % [6.9-23.3]
	PLF	456	93 16.9% [11.7-22.2]
	RF	119	39 24.7% [14.1-35.2]
	Unclassified	221	41 15.6% [10.2-21.1]
Already one case in household	No	412	65 12.6% [5.0-20.2]
	Yes	688	162 20.0% [15.0-25.0]
Neighborhood	Banankabougou	454	96 17.5% [10.6-24.3]
	Faladie	229	49 17.6% [10.3-24.9]
	Yirimadio	417	82 16.4% [10.8-22.0]

It would be interesting to present estimates of seroprevalence among age classes. Is there a linear increasing rate with age ?

Seroprevalences by age and sex are presented in figure 3. The relationship between seroprevalence and age was assessed by a spline function, showing that the linear assumption was accurate, as presented in the following figure:

The section KABP is only partially related to the objective. It corresponds to a descriptive analysis of KABP without any analysis of the relation with seropositivity. It is also unclear why knowledges are presented overall and attitudes and practices compared by gender among age categories.

We have not assessed the relationship between KABP and seropositivity, as the KABP survey was performed after infections, with unknown dates. We think that such an analysis could lead to an over-interpretation of the factors explaining the infection.

We agree with the reviewer: the KABP survey is not totally in accordance with the seroprevalence estimation aim. We have modified the aim of study as follows (Lines 130-132): "We also assessed demographic, social and living conditions associated with SARS-CoV-2 seropositivity, and health behaviors, knowledges according to COVID-19."

We believe that the results, even descriptive, are complementary to the seroprevalence estimation, and give some information to better tailor health strategies, e.g. based on community health workers. More precisely, KABP studies are based on psychosocial theoretical frameworks of health behavior that assume a causal relationship between rational components of individual subjectivity, which limits their use for individual-level analyses (Glanz et al, 2015). Data are collected by questionnaire (opinion surveys). Because of these limitations, KABP models exclude any interpersonal or contextual modeling. KABP studies therefore investigate individual-level differences in knowledge, attitudes, and risk practices toward infectious diseases among population groups and thus help explain individual-level differences.

The survey conducted in Bamako is a community-based epidemiological investigation of SARS-CoV-2 seropositivity considering only demographic characteristics (age and sex) at the individual level using GAMM modeling. In this context, the KABP study provides additional data at the individual level to investigate differences in knowledge, attitudes, and practices towards COVID-19 among age and gender subgroups.

The inclusion of the KABP data in a multilevel model is not epistemologically appropriate, regardless of the mixed models or cluster analyses used. First, the KABP study does not cover all

community members because of the age restriction for participation. Second, the known relationship between demographic characteristics, such as age and gender, and individual attitudes and practices, particularly toward COVID-19 (Rahmann et al), generates statistical interrelationships and confounding factors that are not easily controlled in a single multi-level modeling process. Keeping these methodological constraints in mind, a two-stage modeling approach allows to link individual KABP data to positivity status: the first model constructed at the community level identifies SARS-CoV-2 exposure subgroups (age and gender) in relation to seropositivity, and the second model analyzes significant differences in individual knowledges, attitudes, and practices toward COVID-19 among the population subgroups considered in the first stage model.

Glanz K., Rimer BK, Viswanath K. Health Behavior: Theory, Research, and Practice, Fifth Edition Jossey-Bass; 5th edition (2015), USA.

Rahman MM, Marzo RR, Chowdhury S, et al. Knowledge, Attitude and Practices Toward Coronavirus Disease (COVID- 19) in Southeast and South Asia: A Mixed Study Design Approach. Front Public Health. 2022;10:875727. Published 2022 Jun 21.

According to the reviewer comment, we have performed further investigations presented in the following tables. We also have added a sentence in the result section (lines 352-354):

“Men and women differ in their risk behaviors and practices toward COVID-19 regardless of age. Despite reporting social restriction from the beginning of the epidemic, mainly contact with friends, women were less likely than men to wear a mask outdoors and to avoid going to crowded places”

In order not to make the manuscript too long, we propose to include the additional tables in the appendices:

Table A2: Knowledges, attitudes, behaviors and practices toward COVID-19 among Bamako inhabitants, by sex (Bamako, n=962, 2020)

		Sex %		Univariate* (Women vs Men)		Multivariate* (Women vs Men)	
		Men	Women	OR [CI95%]	p	aOR [CI95%]	p
Age	12-19 y	55.9%	44.1%	1			
	20-39 y	53.9%	36.1%	1.25 [0.54;2.90]	0.62	--	--
	29-64 y	50.5%	49.5%	1.35 [0.57;3.20]	0.49	--	--
	>64y	62.5%	37.5%	1.54 [0.62;3.87]	0.35	--	--
Level of Knowledge toward Covid-19							
13items-score	Mean [SD]	7.90[2.67]	7.57[2.94]	0.96 [0.91;1.00]	0.063	--	--
Attitudes/denials towards COVID-19 measured by agreement (agreed, strongly agreed) with following opinions:							
Help politicians' strategy to take money from	No	52.4%	47.6%	1	0.012	1	0.013
	Yes	61.3%%	48.7%	0.70 [0.53;0.92]		0.70 [0.52;0.93]	

developed countries							
Systematic daily changes in behaviors reported from the start of COVID-19 pandemic:							
Blowing into the elbow	No	53.7%	46.3%	1	0.030	1	0.023
	Yes	64.5%	35.5%	0.65 [0.44;0.96]		0.59 [0.38;0.93]	
Avoiding seeing friends	No	55.7%	44.3%	1	0.173	1	0.004
	Yes	46.9%	53.1%	1.42 [0.86;2.37]		2.03 [1.30;4.20]	
At-risk practices during the seven past days declared (a):							
Wearing mask outside	No	57.7%	42.3%	1	0.055	1	0.005
	Yes	51.6%	48.4%	0.78 [0.60;1.01]		0.68 [0.52;0.89]	
Visiting populated public places	No	50.5%	49.5%	1	0.001	1	0.001
	Yes	61.9%	38.1%	1.59 [1.23;2.07]		1.71 [1.30;2.26]	

(a) Recode into a binary variable: yes [systematically, very often, often] and no [rarely, never]

*Logistic regression

Table A3: Score of knowledge (Mean [SD]) on COVID-19 by sex and age (Bamako, n=962, September 2020).

	12-19y (62.2%)	20-39y (25.3%)	40-64y (10.1%)	>64y (2.5%)
All	7.5 [2.8]	8.2 [2.7]	8.1 [2.5]	8.3 [2.6]
Men (55.1%)	7.7 [2.7]	8.3 [2.7]	7.9 [2.3]	8.8 [2.2]
Women (44.9%)	7.2 [3.0]	8.1 [2.8]	8.3 [2.7]	7.4 [3.0]
p-value*	0.04	0.43	0.36	0.19

*t-test, Men VS Women.

Discussion: several results are discussed without having being presented, such as a higher seropositivity in 20-40 years age group whereas it was only reported in “result section” as associated with older age, and such as relation between symptoms and seropositivity.

We thank the reviewer for this comment. We have corrected the sentence as follows (line 414):

“In our study, seropositivity was higher among older participant, and women”.

We also deleted the sentence on symptoms.

It is written than “young people were less exposed than older despite the higher level of risk practices”, but the authors may compare seropositivity according to high and low risk practices. Moreover, young people may have been similarly exposed but less infected during the first wave.

We agree with the reviewer: As we did not compare KABP and seropositivity, we have over-interpreted our results. We have rephrased these lines as follows (lines 427-429):

“Young people were less exposed than older one. The KABP survey revealed that young participants had, at the time of the survey, a higher level of risk practices, and were more reluctant to change their health behavior”

It is written than "gender differences in outcomes remain problematic". This term is not totally adequate as it can refer both to the potential selection bias or to specific gender vulnerability. This should be clarified

According to the comment, we changed this sentence (see lines 433:434) as follows:
 “Conversely, the differences in results between sex show its role in the transmission of the virus in Bamako.”

We have also strengthened the discussion as recommended by the first reviewer. We presented the weaknesses including the non-involvement of community health workers and the management policy of hospitalising all positive patients (symptomatic or asymptomatic) see lines 459:474.

VERSION 2 – REVIEW

REVIEWER	Patrick, Sean Faculty of Health Sciences University of Pretoria
REVIEW RETURNED	28-Jan-2023

GENERAL COMMENTS	The authors are thanked for addressing all the points raised by the the reviewers. The inclusion of the additional paragraphs are welcomed.
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REVIEWER	Mohsenpour, Amir Universität Bielefeld, Population Medicine and Health Services Research (AG2)
REVIEW RETURNED	15-Jan-2023

GENERAL COMMENTS	Thank you for the revision. I look forward to the publication of this manuscript.
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