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Africans' response to the January 2023 Omicron variant wave in China: the impact of COVID-19 vaccination status

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Abstract

Introduction The January 2023 COVID-19 omicron wave in China garnered wide publicity partly because it evaded most vaccines at that time and resulted in “breakthrough infections” in previously vaccinated individuals. This study focused on the COVID-19 vaccination status and the response of foreigners of African descent who were in China during the January 2023 Omicron-driven COVID-19 wave.

Materials and methods A cross-sectional online survey of Africans in China was conducted in January 2023. Self-report electronic questionnaires were sent to eligible participants across the country, with no restriction on age, gender, or country of origin. Two hundred sixty-six participants were eventually enrolled. Collected data was cleaned and analyzed using SPSS. Descriptive analysis was used to summarize the data in terms of numbers and percentages, while the Chi-square test was used to determine relationships among variables.

Results A total of 266 participants were enrolled, 68.8% males and 31.2% females. The majority (97%) were 45 years and below and mostly students (75.2%). 87.2% were vaccinated, with 53.1% having taken at least 2 shots. Sinovac (53.9%) was the most used vaccine brand. 21.4% reported infection with COVID-19 during the January 2023 omicron wave, with 14.0% reporting “breakthrough” infections. No significant difference was seen in the risk of getting infected with COVID-19 between unvaccinated and vaccinated participants; OR 1.2 (95% CI 0.396–3.634, $p=0.747$). 35.1% reported mild asymptomatic infections, while 64.9% reported symptoms. The majority of the cases (89.5%) were managed from home.

Conclusion In summary, most Africans in China were vaccinated during the January 2023 COVID-19 omicron wave, although “breakthrough” infections were reported. The infection rate among Africans in China was relatively higher than for African Americans and those living in Africa, but the majority were managed from home. Future studies are needed to capture vital COVID-19 information on Africans in China for more tailored responses to future outbreaks.

Keywords COVID-19, Vaccination, Africans, Africans living in China, January 2023, SARS-CoV 2 infection, Omicron wave

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Introduction

On December 7, 2022, the Chinese government suddenly ended its almost 3 years-long zero COVID-19 policy following a brief anti-lockdown protest. This precipitous change in policy resulted in a country-wide surge in COVID-19 infection, and this time predominantly orchestrated by the mutated omicron variant [1]. Unlike its predecessor variant (delta), omicron was less deadly, yet highly contagious [2], with one study, stating it as being 10 times more contagious than the original SARS-CoV 2 [3]. The Omicron variant of COVID-19 received substantial attention partly due to its ability to evade the immunity provided by most vaccines at that point, leading to “breakthrough infections” in individuals who had been previously vaccinated [4].

As of February 2023, China’s national vaccination rate stood impressively at 89.5% [5], yet data on the actual number of people infected during this omicron variant wave was lacking. In the extremes, indirect deductions from testing data, government epidemiologists, modeling simulations, and social media excerpts appeared to suggest that almost everyone in the country was infected within 2 months of the wave [6–8]. However, a study by Pekin University estimated that about 900 million people (close to 64% of the total population) were infected with COVID-19 during the omicron variant surge [9].

In that period, a raft of omicron-related studies were conducted on various aspects of the infection in different categories of people, e.g., the elderly [10], pediatrics [11], pregnant women [12], and the vaccinated and the unvaccinated individuals among others [13]. Among these studies, one notable gap was the absence of research that focused on foreigners residing in China, especially the African diaspora. Considering the distinct genetic make-ups, lifestyles, and cultural practices of individuals of African descent and the Chinese population, this gap in research is particularly of great significance and requires attention.

Documenting their firsthand encounters with the omicron infection holds the potential to provide valuable insights into the disease’s prognosis within the African diaspora residing in China. Subsequently, this can lead to the development of a more effective and culturally tailored response for future outbreaks affecting this specific community.

This study was thus conducted to examine the COVID-19 vaccination status and the response of foreigners of African origin living in China during the January 2023 omicron-driven COVID-19 wave. We particularly focused on vaccination rates, post-vaccination “breakthrough” infections, and the COVID-19 management approach adopted by the Africans living in China.

Materials and methods

Study design and population

A cross-sectional online survey of Africans living and working in China was conducted in January 2023 during the COVID-19 Omicron wave in China. A self-report electronic questionnaire was sent to eligible participants all over the country. All Africans living and working in China at that time were eligible to participate. However, questionnaires were sent to only those who were present on the African official online platforms in China. There was no restriction on age, gender, or country of origin. Fully filled questionnaires were returned by 266 consented participants, who were subsequently enrolled in the study. The questionnaires sought information on the participants’ age, gender, COVID-19 vaccination status, infection and reinfection, and post-vaccination infection among others (see Additional file 1). A person was considered fully vaccinated if they reported to have taken all the required shots according to the vaccine type including the booster dose, while COVID-19 infection was defined as those who reported to have tested positive on either the rapid diagnostic kit or polymerase chain reaction (PCR).

Sampling selection

Data used in this study consisted of Africans currently living in China who completed a self-reported online survey. A convenience sampling method was used. Fully completed questionnaires were returned by 266 participants who voluntarily consented to participate. The sample size was calculated using www.OpenEpi.com based on the participant’s answers from the online survey. Data were collected anonymously based on the consent of participants through the survey of both closed-ended and open-ended questions. The survey information was collected from African official online platforms with over 150,000 members representing all geographical and demographical regions of Africans living in China.

Data collection

Data collected included information about participants’ age, gender, occupation, COVID-19 vaccination status, brand of the COVID-19 vaccine administered, vaccine dosage, COVID-19 infection and re-infection history, infection severity, pre-existing underlying conditions, hospitalization, medication type, and recovery time.

Data analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences, SPSS (Version 27, IBM, Inc.). Descriptive analysis was used to summarize the data in terms of numbers and percentages, while Chi-square test was used to determine relationships among variables.

A binary logistic regression analysis was used to determine the odds of COVID-19 reinfection among vaccinated and unvaccinated individuals. A p value of <0.05 was considered statistically significant.

Table 1 Participants' characteristics and vaccination records

Variables	Total, n (%)
Age (years)	
18–45	258 (97.0)
> 45	8 (3.0)
Gender	
Male	183 (68.8)
Female	83 (31.2)
Occupation	
Students	200 (75.2)
Non-students	66 (24.8)
Vaccination status	
Vaccinated	232 (87.2)
Unvaccinated	34 (12.8)
Doses	
One	15 (6.4)
Two	123 (53.1)
Three	90 (38.8)
Four	4 (1.7)
Vaccine brand	
Sinopharm	46 (19.8)
Sinovac	125 (53.9)
Astra Zeneca	6 (2.6)
Zifivax	7 (3.0)
Johnson&Johnson	4 (1.7)
Others	44 (19.0)

Results

Participant's characteristics and vaccination status

A total of 266 participants were recruited into the study with 68.8% males and 31.2% females. The majority (97.0%) were young people of 45 years and below while 3% were above the age of 45. The participants were mostly students (75.2%). In terms of vaccination, 87.2% of the participants were vaccinated, with 53.1% having taken at least 2 shots. Sinovac (53.9%) was the most used vaccine brand followed by Sinopharm at 19.8% (Table 1).

COVID-19 infection and vaccination status

In total 21.4% (57/266) of the participants reported to have been infected with COVID-19 during the January 2023 Omicron variant wave in China. We grouped the COVID-19 infection into first-time infection, re-infection, and post-vaccine infection. 14.0% of the participants reported first-time infection, while 7.5% had reinfection. Interestingly, 14.0% of them reported to have been infected even though they were already vaccinated with at least two shots of the vaccine (Table 2). We subsequently conducted a binary logistic regression analysis to ascertain whether being unvaccinated increased the odds of first-time COVID-19 infection. The results showed no significant difference in the risk of getting infected with COVID-19 between unvaccinated and vaccinated participants; odds ratio, 1.2 (95% CI 0.396–3.634, $p = 0.747$) (Table 3).

COVID-19 severity and management

Lastly, we assessed COVID-19 severity among the infected participants and how the infections were

Table 2 COVID-19 infection

Variable	First-time infection n (%)		p value	Re-infection, n (%)		p value	Post-vaccination infection, n (%)		p value
	Yes	No		Yes	No		Yes	No	
No. (%)	37 (14.0)	229 (86.0)		20 (7.5)	246 (92.5)		37 (14.0)	229 (86.0)	
Gender									
Males	27 (14.8)	156 (85.2)	0.555	14 (7.6)	169 (92.4)	0.211	28 (15.2)	156 (84.8)	0.082
Females	10 (12.0)	73 (88.0)		6 (7.2)	77 (72.8)		9 (10.8)	74 (89.2)	
Occupation									
Students	30 (15.0)	170 (85.0)	0.371	13 (6.5)	187 (93.5)	0.231	25 (12.4)	176 (87.6)	0.313
Non-students	7 (10.6)	59 (89.4)		7 (10.7)	58 (89.3)		12 (18.4)	53 (81.6)	
Age (years)									
18–45 years	37 (14.3)	221 (85.7)	0.248	18 (7.0)	240 (93.0)	0.091	35 (13.5)	223 (86.5)	0.213
> 45 years	0 (0.0)	8 (100)		2 (25.0)	6 (75.0)		2 (25.0)	6 (75.0)	
Underlying conditions									
Yes	2 (33.3)	4 (66.7)	<0.0001	3 (50.0)	3 (50.0)	0.039	2 (33.3)	4 (66.7)	0.412
No	35 (13.5)	225 (86.5)		17 (6.5)	243 (93.5)		35 (18.3)	226 (81.7)	

Table 3 Vaccination and the odds of infection with COVID-19

Variable	Odds ratio	Probability	P. Value	95% CI of odds ratio
Unvaccinated/ vaccinated	1.200	0.454	0.747	0.396–3.634

Table 4 COVID-19 management

Variables	Total, n (%)
Disease severity	
Asymptomatic	20 (35.1)
Symptomatic	37 (64.9)
Hospitalized	
Yes	6 (10.5)
No	51 (89.5)
Treatment	
Western drugs	31 (54.4)
Traditional Chinese Medicine (TCM)	4 (7.0)
Only support therapy	22 (38.6)
Recovery time (days)	
≤ 10	55 (96.5)
> 10	2 (3.5)

managed. 35.1% of the participants reported mild infections that were asymptomatic, while 64.9% reported symptomatic infections. The overwhelming majority of the cases (89.5%) were managed from home, with only 10.5% getting hospitalized. Most participants (54.4%) reported using Western medications such as anti-fever drugs, pain killers, and cough tablets among others, while a significant number of them (38.6%) did not take any drugs but rather had support therapies such as vitamin C, constant rehydration, and physical exercise Table 4.

Discussion

The purpose of the current study was to examine the COVID-19 vaccination status and the response of Africans living in China to the January 2023 omicron-driven COVID-19 wave in China. While numerous studies have reported on various aspects of the Omicron variant wave in China, none has specifically addressed the vaccination status, infection rates, and management experiences of the African diaspora residing in China during that period. We thus conducted an online self-reported survey of 266 Africans and asked them a series of questions in relation to COVID-19 vaccination, infection, and management strategies post-infection.

According to the WHO data on COVID-19 vaccination in China, as of the 30th of August 2023, a total of 3,515,872,818 doses of COVID-19 vaccines had been

administered [14]. Currently, it is estimated that about 500,000 Africans live in China, mostly as students and business people [15]. Of those we surveyed, 87.2% were vaccinated, with 53.1% having taken at least 2 shots of any vaccine type administered. This was consistent with the China national COVID-19 vaccination rate average that stood at 89.5% as of February 2023 [5]. The high vaccination rate seen among Africans living in China in this survey could be attributed to the vivid COVID-19 vaccine campaign that was adopted by the Chinese authorities prior to the Omicron variant wave of January 2023. This included a combination of vaccine mandates for accessing public transport, university campuses, and other public places, along with consistent encouragement of every eligible individual to get vaccinated [16]. Furthermore, while factors such as concern with vaccine safety and side effects, the lack of trust in big pharmaceuticals, and misinformation or conflicting media information drove vaccine hesitancy among Africans living in Africa [17]. In China, the messaging was consistent, both foreigners and the Chinese received the same vaccines, and the vaccines were made with the old adenovirus-based technology that is widely known to be safe [18]. This could have also increased trust in the vaccine among the Africans in China.

The COVID-19 Omicron variant was less deadly but highly contagious. It replicated much faster than the original SARS-CoV-2 or the delta variant [2]. A study has reported the contagion of the Omicron variant to be 10 times higher compared to the original SARS-CoV 2 [3]. In our survey, 21.4% of the participants reported infection during the January 2023 Omicron wave in China. This was relatively higher than the infection rate among African Americans, reported to be 12.4% as of March 2023 [19], while in Africa, Omicron infection rates peaked at about 10.0% [20]. The high infection rates seen in our survey could have been due to the loss of vaccine immunity among the Africans as the omicron variant evaded vaccines. This could also have been attributed to the absence of herd immunity, as China implemented the zero-COVID policy, which resulted in limited infections among the population, thus preventing the development of herd immunity [21]. It should also be noted that our infection rate figure was a one-point-in-time report, while the American and African figures were cumulative averages over a period of time which could also account for the differences observed. We also observed a higher infection rate among students compared to non-students. While we acknowledge that students could have been disproportionately sampled more than the non-students, it could also be that they were more exposed to

COVID-19 because of living in overcrowded schools and college campuses.

While vaccines contributed heavily to slowing down infection and preventing infected people from getting severe COVID-19 infection, the Omicron variant largely evaded vaccines at the start of Omicron-dominated waves of infection. This was because the vaccines were made to target the original strain of the virus and the delta variant. Furthermore, one study revealed that vaccine efficacy waned significantly after 6 months post-vaccination [22]. In our survey, 14.0% of the participants reported COVID-19 infection despite being vaccinated. A logistic regression analysis to determine the effectiveness of vaccines in preventing first-time infection showed no difference between those vaccinated and the unvaccinated. These findings are in line with those from Europe and the USA which showed that vaccines did not necessarily prevent people from getting infected but rather prevented severe infection and hospitalization [23–25].

One defining feature of the Omicron variant was that while it was highly infectious, it caused relatively mild illnesses compared to its predecessor, the delta variant [26, 27]. An overwhelming majority of our study participants (89.5%) reportedly managed their illnesses from home. Similarly, a significant number (38.6%) did not take drugs but rather used support therapies such as vitamin C, constant rehydration, and physical exercise to manage the infections that were usually mild.

To the best of our knowledge, this is the first study to examine the COVID-19 response of the Africans living in China to the Omicron wave of January 2023, it had the following limitations: (1) It was a retrospective study and so carries the inherent biases of respective studies such as recall bias. (2) The study results relied on the participant's self-reported diagnosis of COVID-19 and so should be interpreted accordingly. (3) The overall sample size was relatively small compared to the total number of Africans living in China at the time. This could limit the generalization of the findings. (4) The study only focused on a single wave of the Omicron variant in China and so may not be a complete representation of infection among Africans in China.

Conclusion

In summary, this study revealed that the majority of the Africans who were in China during the January 2023 COVID-19 Omicron wave in China were vaccinated against the virus, although that did not prevent the majority from still getting infected. The infection rate among Africans in China was relatively higher than for African Americans and those living in Africa. While the Omicron variant was highly infectious, the majority of

the cases among Africans were mild and managed from home. Future studies are needed to capture vital COVID-19 information on Africans living in China for a more tailored response to future outbreaks.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s43162-023-00268-3>.

Additional file 1.

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Authors' contributions

ET: methodology, validation, formal analysis, investigation, data curation and conceptualization, writing-original draft, writing-reviewing, and editing. FFF: methodology, validation, formal analysis, investigation, data curation and conceptualization, writing-original draft, writing-reviewing, and editing. JAN: methodology, validation, formal analysis, investigation, data curation, writing-original draft, writing-reviewing and editing. MA: methodology, validation, investigation: methodology, validation, formal analysis, investigation, writing-reviewing and editing, PK: methodology, validation, investigation and formal analysis JOB: methodology, validation, investigation and formal analysis, CVO: methodology, validation, investigation and formal analysis MO: methodology, validation, investigation and formal analysis, MK: methodology, validation, investigation and formal analysis, writing-reviewing and editing, SEP: methodology, validation, investigation and formal analysis, writing-reviewing and editing, EKD: methodology, validation, investigation and formal analysis, writing-reviewing and editing, IOA: methodology, validation, investigation and formal analysis, writing-reviewing and editing, TEK: methodology, validation, formal analysis, investigation, data curation and conceptualization, writing-original draft, writing-reviewing and editing, project administration and supervision. All authors read and approved the final manuscript.

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Availability of data and materials

All data for this study are within the manuscript.

Declarations

Ethics approval and consent to participate

All participants consented to participate in this study.

Consent for publication

NA.

Competing interests

The authors declare that they have no competing interests.

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