

Preplanned Studies

Safety and Effectiveness of SA58 Nasal Spray Against COVID-19 Infection in Medical Personnel: An Open-Label, Blank-Controlled Study — Hohhot City, Inner Mongolia Autonomous Region, China, 2022

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Summary

What is already known about this topic?

The active ingredient of the SA58 Nasal Spray is a broad-spectrum neutralizing antibody with a high neutralizing capacity against different Omicron sub-variants in vitro studies.

What is added by this report?

This study demonstrated the safety and effectiveness of SA58 Nasal Spray against coronavirus disease 2019 (COVID-19) infection in medical personnel for the first time.

What are the implications for public health practice?

This study provides an effective approach for the public to reduce their risk of COVID-19 infection. The findings of this research have the potential to significantly reduce the risk of infection and limit human-to-human transmission in the event of a COVID-19 outbreak.

The coronavirus disease 2019 (COVID-19) pandemic has had a significant impact on public health, society, and the economy. In September 2022, an outbreak of the COVID-19 Omicron variant occurred in the Inner Mongolia Autonomous Region, particularly in Hohhot. To accommodate the influx of COVID-19 patients, several designated COVID-19 hospitals and Fangcang shelter hospitals were built in Hohhot. Medical teams from across China were deployed to these hospitals, but they were at high risk of contracting COVID-19 and experienced significant infections within weeks. The approved COVID-19 vaccines have limited effectiveness in protecting against infection and blocking transmission (*1*), and other countermeasures, such as pre-exposure or postexposure prophylaxis, are urgently needed to protect against SARS-CoV-2 nosocomial infection in hospitals.

Sinovac Life Sciences Co., Ltd. has recently developed a nasal spray of broad-spectrum antibody against COVID-19 (SA58 Nasal Spray) (*2–6*). This study evaluated the safety and effectiveness of SA58 Nasal Spray in protecting medical personnel who worked in the designated COVID-19 hospitals and Fangcang shelter hospitals during the outbreak in Hohhot.

In this open-label, blank-controlled study conducted in Hohhot, Inner Mongolia Autonomous Region, medical personnel aged 18 years and older who worked in the two designated COVID-19 hospitals and four Fangcang shelter hospitals were recruited. Participants who agreed to use SA58 Nasal Spray were asked to provide informed consent and subsequently administered SA58 twice a day with an interval of six hours for approximately 30 days, while the remaining medical personnel who did not use the drug were divided into the control group. This study received approval from the Institutional Review Board of the Inner Mongolia Fourth Hospital (202223). This study is registered at ClinicalTrials.gov as NCT05664919.

Throat swab sampling and RT-PCR (reverse transcription-polymerase chain reaction) testing were conducted daily for all participants. COVID-19 case monitoring began on the day of SA58 Nasal Spray administration and continued for 30 days. All participants who used SA58 Nasal Spray were asked to report any adverse events (AEs) daily for 30 days via an APP for medication information collection in WeChat.

The effectiveness of SA58 Nasal Spray was evaluated based on the cumulative incidence of COVID-19 cases. The cumulative incidence for each group was defined as the number of COVID-19 cases divided by the number of person-days during the observation period. As medical personnel were not working on a fixed schedule in the hospitals and many were working on different shifts and rotations during the 30-day observation, the working person-day was mainly used

for further analysis.

A total of 6,662 RT-PCR negative medical personnel working in two designated hospitals and four Fangcang shelter hospitals receiving COVID-19 cases in Hohhot, the Inner Mongolia Autonomous Region, were enrolled in this study. During the observation period, 1,596 participants from other provinces' medical teams left Hohhot within two days of receiving the SA58 Nasal Spray, and were thus excluded from the Effectiveness Assessment Set. Of the 3,368 participants using SA58 Nasal Spray, 1,736 reported their medication information via an APP. The median age of the APP-reported participants was 34 years (ranging from 24 to 58 years), with approximately 23% in their twenties, 53% in their thirties, 21% in their forties, and 2% in their fifties. The gender ratio (M/F) was 23%/77%. No special coexisting conditions were recorded among the participants.

A total of 135,544 working person-days were counted, with 27,103 person-days in the drug group and 110,441 in the control group (Figure 1).

A total of 135 RT-PCR positive cases were identified, resulting in a crude infection rate of 2.66%

(135/5,066). Of these 135 positive cases, 128 were in the control group and 7 were in the drug group. The cumulative number of cases during the observation period showed a rapid increase of positive cases in the control group, while the drug group experienced a notably slower increase (Figure 2). The cumulative incidence was 0.026% (7 cases out of 27,103 person-days) in the drug group and 0.116% (128 cases out of 110,441 person-days) in the control group. The effectiveness of the SA58 Nasal Spray in protecting medical personnel working in COVID-19 designated hospitals and Fangcang shelter hospitals was calculated to be 77.7%.

Of the 1,736 medical personnel who reported the SA58 Nasal Spray medication information via APP, 1,794 AEs were reported by 497 medical personnel. The incidence of AEs was 28.6% (497/1,736). The majority of AEs were administrative site AEs, including rhinorrhea (14.5%), nasal mucosal dryness (9.6%), sneezing (8.7%), nasal obstruction (6.0%), headache and dizziness (2.0%), pharyngolaryngeal discomfort (1.0%), discomfort in the nose (0.9%), cough (0.5%), nausea (0.4%), expectoration (0.4%), and rash (0.3%), which were infrequently reported (Figure 3). Fever and

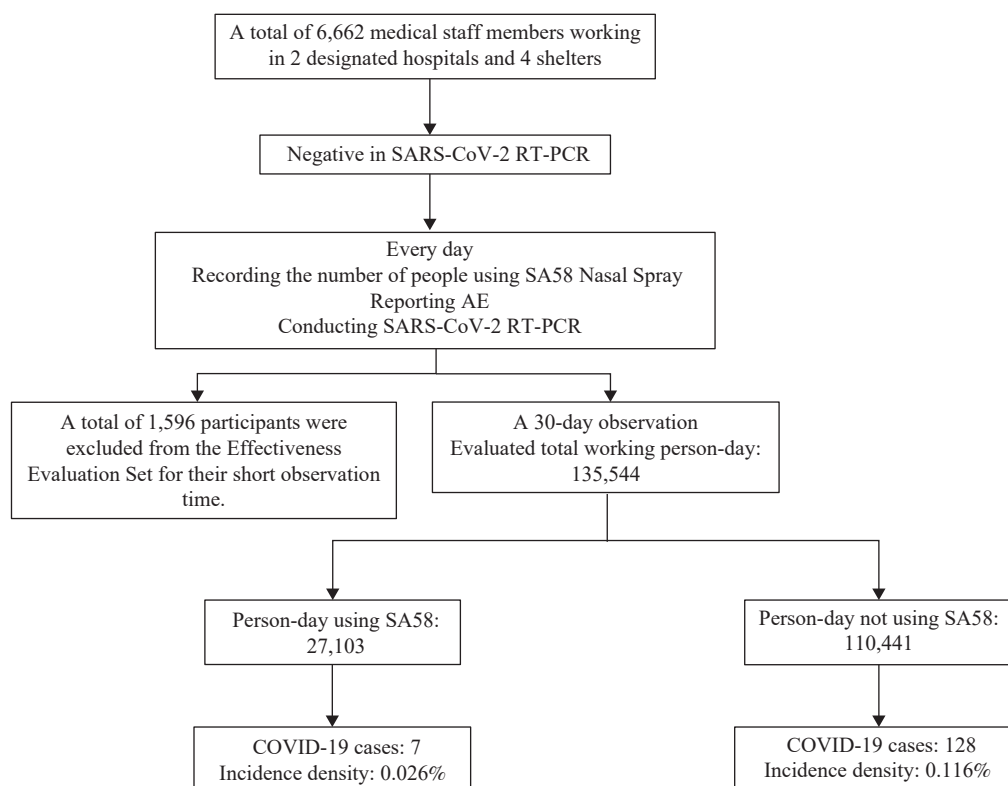


FIGURE 1. Study design and procedures of SA58 Nasal Spray in medical personnel.

Abbreviation: RT-PCR=reverse transcription-polymerase chain reaction; AE=adverse event; COVID-19=coronavirus disease 2019.

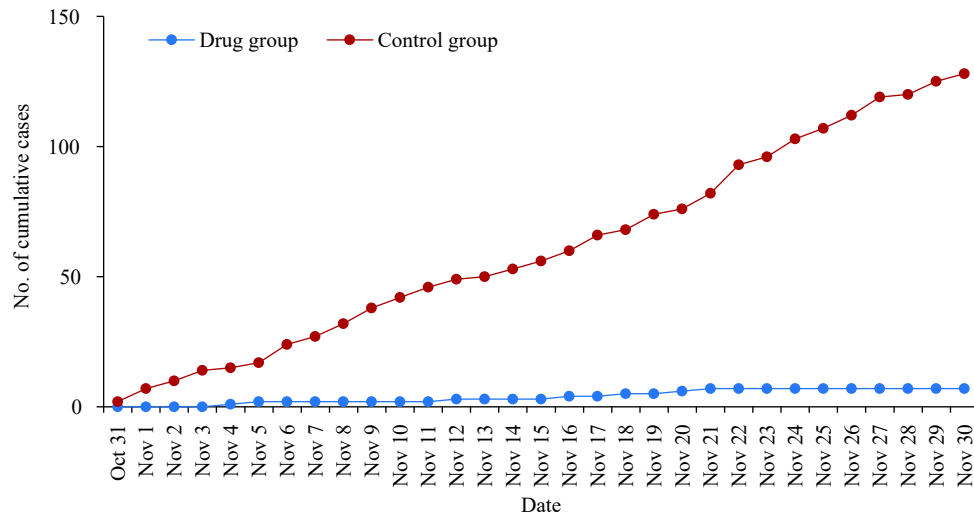


FIGURE 2. Cumulative coronavirus disease 2019 (COVID-19) cases in the drug group and the control group over a 30-day observation period, 2022.

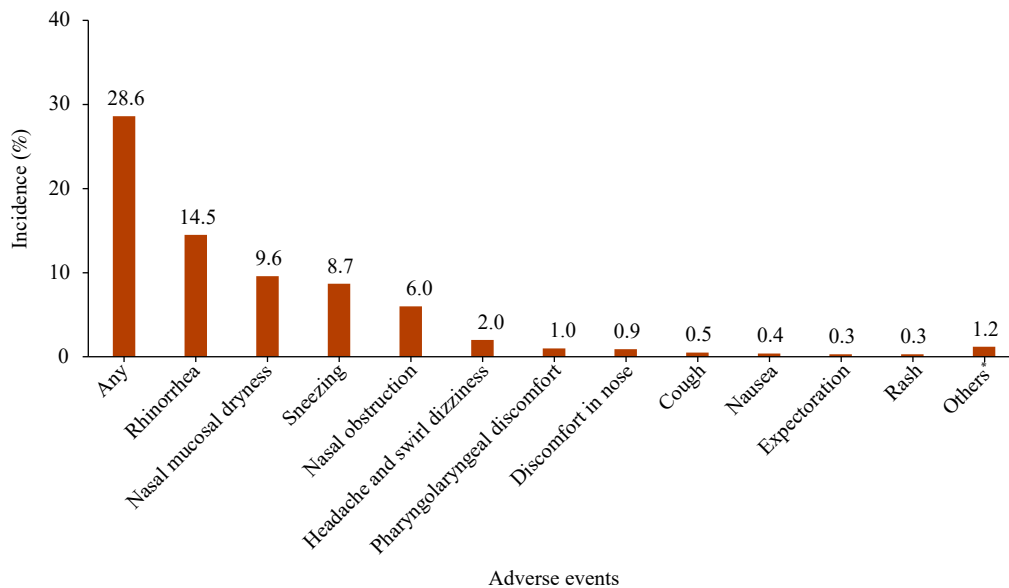


FIGURE 3. Incidence of reported adverse events (AEs) in the drug group during the 30-day observation.

Note: The X-axis indicates various AEs, and the Y-axis indicates the incidence of AEs.

* Others included mild fever, palpitation, muscle pain, bleeding nose, cold sweat, pruritus cutaneous, gastrointestinal reaction, eye pain, gasping, tight chest, dry mouth, redness of eyelid conjunctiva, and skeletal pain.

other systemic AEs were extremely rare. The severity of all the AEs was mild, and all of them resolved quickly without affecting daily activities.

DISCUSSION

An open-label, blank-controlled study of SA58 Nasal Spray was conducted among medical personnel working in designated hospitals and Fangcang shelter hospitals for COVID-19 from October 31 to

November 30, 2022. Virus genome sequencing assay showed that in Hohhot, the Omicron VOCs circulating during this period were BF.7, BA.5.2, BA.5.2.1, BQ.1.2, etc., with BF.7 being the predominant one. SA58 Nasal Spray demonstrated notable efficacy, as evidenced by a substantially lower incidence of COVID-19 cases in the drug group compared to the control group during the 30-day follow-up period. The effectiveness of SA58 Nasal Spray for preventing SARS-CoV-2 infection among medical personnel working in the COVID-19

designated hospitals and Fangcang shelter hospitals was as high as 77.7%. The SA58 Nasal Spray was also well-tolerated. Of the 1,736 participants, 497 reported AEs with an incidence rate of 28.6%. Given that participants who did not experience AEs may have been less likely to report their medical information through the APP, it is possible that the actual incidence of AEs may be lower than the reported 28.6%. Among those participants who reported local AEs, most of them using SA58 Nasal Spray recorded that those mild AEs were almost ignorable and did not affect their daily work.

Infection and transmission of COVID-19 are not only attributed to virus variants, but also to many other physical components. It is worth emphasizing that all participants in this study were medical personnel dealing with COVID-19 cases, a population at high risk for infection. Despite being equipped with appropriate personal protective equipment (PPE), the medical personnel in the control group reported a crude COVID-19 infection rate of 2.66% during the 30-day observation, which was notably higher than the infection rate in the general population in Hohhot during that period. In addition to PPE, the SA58 Nasal Spray provides another specific protection tool that is easy to use for medical personnel and other high-risk professionals when in service.

Omicron VOCs have generally been associated with mild clinical severity, however, they can still cause severe clinical outcomes in the elderly or those with underlying diseases (7). Vaccinating these populations is essential to avoid severe consequences (8–9), although it is not effective at preventing infection. Currently, there is no SA58 Nasal Spray data available for the elderly and those with underlying diseases; however, the mild AEs observed in this study suggest that the spray may be safe for these populations.

We must acknowledge that this study is not a placebo-controlled, double-blind study, which could introduce data bias. The frequent rotation of medical personnel between different medical institutions makes it difficult for many participants to complete the full 30 days of observation. Additionally, it is also difficult to accurately monitor the daily frequency of medications. The protective efficacy of SA58 Nasal Spray requires further verification through additional clinical trials.

In conclusion, this clinical study of the SA58 Nasal Spray on medical personnel demonstrated good tolerance and effectiveness in preventing COVID-19 infection, suggesting potential application in other

populations in the real world.

Conflicts of interest: X. Xie and Y. Cao are the inventors of the provisional patent applications for the anti-COVID-19 monoclonal antibody (SA58), which has been transferred to Sinovac Life Sciences Co., Ltd. for clinical development. C. Jin, J. Li, G. Zeng, and L. Fang are employees of Sinovac Biotech Co., Ltd., while F. Xue and Y. Hu are employees of Sinovac Life Sciences Co., Ltd. All other authors declare no competing interests.

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