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Research Article

# An Overview of Signs and Symptoms to Determine Coronavirus and Omicron Patients in Primary Care and Hospitals

**Ali M. Hussein[1], Hawry A. Majeed[1], Naz R. Majeed[1], Nza H. M. Ali[1], Dashne A. Saeed[2], Narmin A. Ali[3]**

*[1]Department of Biomedical Sciences, College of Science, Cihan University-Erbil, Kurdistan Region, Iraq, [2]Department of General Education, College of Education, Cihan University-Erbil, Kurdistan Region, Iraq, [3]Department of Community Health Nursing, College of Health Technology, Cihan University-Erbil, Kurdistan Region, Iraq*

## ABSTRACT

Coronaviruses, a type of virus family, cause severe respiratory diseases in people. The coronavirus is most frequently linked to the common cold, but in persons with severe acute respiratory syndrome virus infection, it can also lead to serious respiratory sickness. The spread of the coronavirus is by having direct contact with infected saliva, mucus, or blood. Infected surfaces, such as those in hospitals or other health-care facilities, can potentially spread the infection when touched. Now, spreading globally is the Omicron version of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). According to preliminary studies, the Omicron variant of SARS-CoV-2 has a higher probability of re-infection. To recognize coronavirus disease 19 as well as Omicron people in hospitals and primary health care, this review study focuses on the symptoms and indications. The data were collected and analyzed from more than 100 high-impact original research papers to conclude their results and make a comparison between methods and findings.

**Keywords:** Coronavirus disease 19, omicron, health care, signs, symptoms

## INTRODUCTION

The first report of the coronavirus infection came from Wuhan which is a city in China, in December 2019. This infection is life threatening which is endangering people's health and well-being.[1] Global coronavirus disease 19 (COVID-19) mass immunization programs have demonstrated the efficacy of this strategy. Influenza and COVID-19 infections weaken the host's immune system, which provides an ideal setting for bacterial and viral pathogens to exploit and produce secondary infectious diseases.[2] COVID-19 (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) and other coronavirus infections can cause mild respiratory symptoms up to severe pneumonia.[3] The World Health Organization stated (COVID-19) was a worldwide pandemic on the 11th of March, 2020. Evaluation of symptoms and signs has been proposed as a viable method.[4]

Significant advancements in COVID-19 testing, prevention, and treatment have been accomplished 2 years after it was recognized as a global epidemic.[5] Because there is no approved immunization for children aged 0–4 years old, children everywhere are in danger of contracting SARS-CoV-2 infection1.[6] The two companies authorized to produce messenger ribonucleic (mRNA) COVID-19 vaccines, Pfizer-BioNTech and Moderna, have indicated their capability to develop vaccinations tailored specifically for the Omicron variant in 100 days.[7] There are more than 50 known variants of the Omicron variant, 32 of which are found in the spike protein.[8] During the peak of Omicron's prevalence in January 2022, unvaccinated adults had hospitalization rates that were 12 times higher than individuals who had received booster or additional vaccinations.[9] The Omicron variety was recognized on the 9th of November, 2021, in South Africa's City of Tshwane, Gauteng province, resulting in a dramatic spike in hospital admissions as well as exponential growth in the number of incidents.[1] The Omicron form (B.1.1.529) of the SARS-CoV-2 virus, which results in COVID-19, was found in the United States for the 1st time.[10] Compared to earlier variations, Omicron seems to cause less severe acute sickness, at least in people immunized.[11] Omicron-affected

**Corresponding Author:**
Ali M. Hussein, Department of Biomedical Sciences, College of Science, Cihan University-Erbil, Kurdistan Region, Iraq.
E-mail: ali.m.hussein@cihanuniversity.edu.iq

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patients most frequently displayed fever, extreme weariness, a moist cough, a stuffy nose, diarrhea, head pain, and other pains in the body.[12] Early in 2022, Omicron took over as the predominant version in some parts of Europe.[13] In 2021 and 2022, most of the COVID-19 crises were brought on by Omicron and Delta variants.[14] Despite the little improvement after the booster dosage, vaccines give less protection against symptomatic Omicron infection than they do against the Delta form, according to observational studies in the general population.[14] Anxiety and despair have increased significantly since the COVID-19 pandemic, particularly after the Omicron wave.[15] The Omicron version is resistant to modern vaccines more than previous variants.[16]

By the end of December 2021, the extremely contagious SARS-CoV-2 Omicron variant, which was first discovered in November 2021 in Southern Africa, had taken over in the United States.[10] A coronavirus outbreak (COVID-19) which occurred in China in the city of Shanghai from February to June of 2022 was brought on by SARS-CoV-2 Omicron BA.2 sub-lineage.[17] However, it revealed that Omicron infections resulted in significantly fewer hospitalizations than Delta infections because the cases of Omicron COVID-19 in South Africa climbed quickly.[18] There have been waves of hospital-onset COVID-19 infections (HOCI) during the COVID-19 epidemic.[19] Globally, COVID-19 has resulted in 543 million illnesses and 6.3 million fatalities as of June 2022.[20] Furthermore, to assume the risk of hospitalization among outpatients, the out CoV rating was created and internally verified in Switzerland without needing laboratory tests.[21] In South Africa, Europe, and Canada, Omicron (B.1.1.529 and BA lineages) has created less serious illnesses than previous variants.[22] In early 2022, Omicron took over as the predominant version in some parts of Europe.[13] During the Omicron pandemic in Hong Kong, elderly people 60 years of age or over made up more than 95% of the fatal cases.[23] Omicron has expanded quickly, and as of January 6, 2022, 149 countries across all six World Health Organizations had been confirmed to have it.[24] When the Omicron variety was more common, a child infected with it had a lower possibility of hospitalization – between a quarter and a half – than when the Delta variant was more common.[25] In Qatar, a wave of SARS-CoV-2 Omicron (B.1.1.529)1 coronavirus caused severe acute respiratory syndrome topped in mid-January 2022.[26] In South Africa's initial three COVID-19 waves, the pediatric disease burden was not very severe, with most children exhibiting asymptomatic or mild-to-moderate disease.[27]

## METHODS

### Search Methodologies and Criteria Selection

In conducting this systematic review, the recommended reporting elements for systematic reviews and meta-analyses (PRISMA) criteria were followed. The question of the study was: What clinical signs are most prevalent in COVID-19 and Omicron patients?

We chose studies that research the epidemiological characteristics of COVID-19 patients hospitalized in PubMed, BMC, Medline, and Scopus databases between January 1st, 2021, and December 1st, 2022, using the descriptors COVID-19, SARS-CoV2, 2019-nCoV, n-CoV, and coronavirus merged with "clinical profile" or "epidemiological profile." We wanted to find whether COVID-19 and Omicron patients shared any common clinical symptoms studies although which primary care and hospitality were followed for these patients (Figure 1). The Boolean operators "AND" and "OR" were used for the search strategy. A manual search for references listed in the papers was also done.

### Requirements for Eligibility

In addition, investigated were clinical trials, cohorts, cross-sectional data, clinical case studies, and case series published worldwide in different languages. Official diagnostic reports, remarks, evaluations of literature, papers with restricted access to the material, and animal experimentation were removed.

### Variables for Investigation

This study's goal was to find clinical manifestation features in COVID-19 and Omicron individuals. The resulting features were investigated: Study nation, study population, gender (male and female), age, and clinical symptoms.

### Preference of Studies

Two separate researchers conducted the search. Following this action, they independently carried out the subsequent procedures: Reading the title and synopsis to identify possibly relevant research, reading the entire article, gathering variables, and building the database are the first three steps. The differences were discussed among the researchers and then resolved.

### Data Analysis

Both authors utilized a systematic data extraction form to independently and twice extract data from the reports of all included studies. Discussion was used to settle differences in the retrieved data. When possible, the following data have been gathered from each chosen article: The initial author, the publishing year, the study's design, the number of cases, gender, age, clinical symptoms, laboratory tests, radiological examinations, and the results (discharged, still hospitalized, or death).

## RESULTS

### COVID-19 Predictors in Outpatient and Children with Symptoms

A total of 5336 children had signs or symptoms that were consistent with COVID-19 but did not require hospitalization; about 4166 were in secret practice (including 80 pediatricians), while 1170 were in hospital emergency rooms (13 hospitals). The majority (53.5%) of them were men, with a median age of 3.0 years. The percentage of positive test results (SC2-RT-PCR and/or SC2-RAT) over the course of the entire trial was 13.9% (741/5, 336; 95 confidence interval [CI] 13.0–14.8) and was 5.6% (102/1, 825; 95 CI 4.6–6.7) for period 1; 7.4% (107/1, 453; 95 CI 6.1–8.8) for period 2; 12.6% (156/1, 236; 95 CI 10.8–14.6) for period 3; and 45.7% (376/822;

95 CI 42.3–49.2) for period 4 ($P < 0.001$ between the four periods). Throughout the study of the course, the percentage of positive test results for children who had a confirmed COVID-19 contact was 38.9% (95 CI 36.3–41.6), which was 7.0 times higher than the percentage for children who had no confirmed COVID-19 contacts (5.6%, 95 CI 4.9–6.3, Chi-square test $P = 0.001$).[25]

The most commonly reported symptoms included mood fluctuations, rashes, gastrointestinal problems, coughing, and lack of appetite among children aged 0–3 years old while children between the ages of 4 and 11 years most frequently had mood fluctuations, memory loss, attention issues, and rashes. The symptoms of long COVID are described as new symptoms that appeared with SARS-CoV-2 infection and persisted for 8 weeks following the discovery of a positive SARS-CoV-2 examination result.[6]

## Omicron-caused Disease Burden from COVID-19

From February 26 to June 30, 2022, there were 9% symptomatic cases, 91.00% cases that were asymptomatic, and 1% death situations. The total rate of infection was 2.74%. Children aged 3–17 had the lowest infection rates, and the highest were in those 60–79 years old.

With age, the incidence of severe/critical infection rose. Individuals aged 80 and up had the highest rate of 12.5% people, which was substantially greater than the rate of 0.001% people aged 3–17 years.

The mortality rate for all people was 2.42% people. In terms of age categories, those aged 3–17 years had a 0% death rate, 0.02% people aged 18–39 years, 0.32% aged 40–59 years, 4.60% aged 60–79 years, and 57.17% people aged 80 years or older.[17]

## Hospitalizations for Children that had COVID-19 during the Initial Omicron of SARS-Cov2

The SARS-CoV-2 Omicron form is highly contagious in South Africa in the Tshwane district, as indicated by the sharp rise in pediatric COVID-19 cases and hospitalizations. A continuous observational study is required to determine the Omicron variation's long-term effects on kids and teenagers.[28]

Of the 2550 COVID-19 patients hospitalized during this time, 462 (18%) were under the age of 19 (Figure 2). Comparatively speaking to the three prior SARS-CoV-2 waves, there were more pediatric cases. Unusually rising ahead of adult hospital admissions. In the district, sequencing was done on 75 viral samples from adults and children, and 74 (99%) of those samples were the Omicron variety. Out of 183 hospitalized children with COVID-19, 138 (75%) had comprehensive clinical records available. Eighty-seven (or 63%) of the 138 kids were under 4 years old.[29]

The cases included symptoms such as fever (61%), cough (57%), shortness of breath (31%), seizures (31%), vomiting (26%), and diarrhea (25%). COVID-19 was the main diagnosis in 61 (44%) of the 138 cases (Figure 3). Two days on average were spent in the hospital (range, 1–3). Of the 138 kids for whom data were available, 122 (88%) required routine care in hospital and 27 (20%) required oxygen treatment. Four (33%) out of 138 children who participated in the trial died, and 7 (5%) of them required ventilation due to complicated underlying pathologies (Figure 4). With data from 84 parents or guardians, 77 (92%) were COVID-19 not vaccinated, as were all the children.[30]

## Omicron BA.1 and BA.2 SARS-Cov-2 Infections and Hospitalizations

Figure 5 shows that from 333 adult patients diagnosed with the Omicron variation, 86.1% had BA.1, 4.8% had BA.2, and 5.4% had both BA.1 and BA.2. Patients with BA.1 had clinical hospitalizations lasting longer than 24 h in 39.4% of cases, <24 h in 9.8% of cases, and only outpatient visits in 50.9% of cases. Clinical hospital admission rates for adult BA.2 patients were 50% for inpatient stays and 50% for outpatient visits.

The Omicron variation was discovered in 96 pediatric patients. One child was found to have either BA.1 or BA.2 (1.4%), whereas BA.2 was found in 15.9% of the kids and BA.1 in 82.6% of the kids. The average amount of time spent in clinical hospitals by BA.1 patients was 26.3%, 1.8% for stays of <24 h, and 71.9% for outpatient visits exclusively. Meanwhile, 36.4% with BA.2 had clinical hospitalization extended beyond 24 h and 63.6% of them just required an outpatient visit.

According to the study, only 19% of pediatric patients and 45% of hospitalized adult BA.1 or BA.2 patients were first COVID-19 instances.[31]

## Perspectives Pertaining to Pneumonia

Along with COVID-19 signs such as high body temperature, cough, or other respiratory symptoms, moderate individuals also had pneumonia symptoms. In pulmonary imaging, the individuals with pneumonia revealed >50% lesion development within 24–48 h. Pneumonia is less likely to develop from an Omicron infection than a Delta infection. Both the administration of booster doses 6 months after receiving the initial vaccines and the first 6 months afterward were linked to a significantly decreased incidence of pneumonia. Age range, kind, and immunization status were all significant predictors of pneumonia, according to univariate and multivariate investigations.

## Variations of Pneumonia and Immunization Status

By an immunization group, Figure 6 shows the proportion of pneumonia-related Delta variant infections ranged from 30.77% to 69.17%, whereas the proportion of pneumonia-related Omicron infections ranged from 14.76% to 36.71%. Only 42.31% of individuals who had all their main immunizations before an Omicron infection developed pneumonia, in contrast to 80.77% of those over 50 before the Delta infection. Patients with the Omicron variant infection had a 66% lower chance of getting pneumonia than those with the Delta variant sickness. Greater neutralizing antibody titers (hybrid immunity) following a natural infection may occur compared to primary and booster immunity, as well as viral

load disparities by variant. Individuals were divided based on their vaccination history: Those who received a booster dose, total main immunization after 180 days of diagnosis, and total main immunization before 180 days of diagnosis. In the case of Delta variant infections, complete main immunization 6 months after the illness decreased the chance of pneumonia to 52%. In contrast, immunization at least 6 months before infection, and receipt of booster injections lessened the chance of pneumonia by 82%. Complete main immunization around 6 months lowered the occurrence of pneumonia in cases of Omicron infections by 66%. In the case of those who received booster injections, there were too few Omicron cases to establish a reliable odds ratio of pneumonia. There were no significant or extremely serious Omicron infections, and the incidence of pneumonia was improved among Omicron infections rather than Delta infections across all age groups and immunization status. The results provide an estimate of the connection between immunization status and pneumonia rather than an indication of the effectiveness of the vaccine against pneumonia.[14]

## Effectiveness of COVID-19 mRNA Vaccination Doses Toward the Omicron Variant

Residents of continuing concern during an Omicron dominant phase although doses of COVID-19 mRNA vaccine (95% of study subjects acquired mRNA-1273) raised safety toward any SARS-CoV-2 infection, symptoms of disease, and also poor results. However, there are still numerous unanswered questions regarding the fourth dose in this cohort, including the prevention length, for the mRNA-1273 vaccination in particular. In long-term care services, combining vaccination with additional precautions for public health such as mask use, better ventilation, and physical separation may enable this extremely susceptible group to receive the best possible protection from SARS-CoV-2.[32]

## Impact of Vaccination on Clinical Treatment Outcomes During the Omicron

Before contracting SARS-CoV-2, 190 patients had gotten the COVID-19 vaccine 3 times or more. Of those, 30.2% of the patients received two doses, 7.9% of individuals receiving three dosages of mRNA vaccination, and 26.2% of patients with three dosages required additional oxygen (Figure 7). Even after adjusting for age, the three doses of mRNA vaccination had a continuing effect on the demand for oxygen and hospitalization rate, having undergone a liver transplant, the number of coexisting conditions, and storm medication. The results remained unchanged between patients who received the mRNA-1273 vaccine and those who got the BNT162b2 vaccine.[33]

## Pathological Profiles and Results among Adults with Hospitalized SARS-CoV-2 Infection During Periods of B.1.617.2 (Delta) and the B.1.1.529 (Omicron) Variant

The coronavirus-causing SARS-CoV-2 virus (Omicron) form has prevailed the (Delta) variant being the common strain in California. Compared to earlier versions, the Omicron form is more contagious and immune to vaccination neutralization. There were fewer hospital deaths among fully immunized Omicron-period patients than among Delta-period people. For older people with SARS-CoV-2 infection, vaccines including a booster shot for those who have already received the vaccine remain essential in reducing the risk of serious health consequences. More people had received all advised immunizations and fewer persons had not been among 737 adults hospitalized during the Omicron era. This compares to the 339 individuals hospitalized during the Delta dominating period. Less Omicron-period patients needed to be admitted to the intensive care unit (ICU) than Delta-period patients did. Adults who were fully immunized and hospitalized during the Omicron predominance period died less frequently than those who were hospitalized during the Delta predominance period.[34]

## Vaccinations for Omicron Infection as Opposed to Omicron Sickness

Despite the fact that the vaccine normally has a higher efficiency against severe Omicron disease, several studies have found variations, including rapid apparent waning. In comparison to other forms, including Delta, the vaccine's protection against Omicron-caused illness and infection is less effective. The average effectiveness of immunization against severe Omicron disease is greater, possibly due to the continued existence of cellular immunity. It is now more difficult to determine the efficacy of vaccination against Omicron severe illness, nevertheless, due to the high incidence of infection. At least 3 months following the booster dosage, there have not been many trials evaluating the vaccine's effectiveness against severe Omicron illness. When hospitalization for severe illness is regarded as requiring neither COVID-19 clinical criteria nor hospitalization without those requirements, there has been some evidence to suggest that the effectiveness of vaccines decreases beyond the first series, especially after 3-month post-vaccination. In comparison to the Delta, the Omicron showed a larger variation in vaccination efficacy among hospitalized cases. In addition, using all admissions caused a gradual reduction in "severe" Omicron illness effectiveness whereas utilizing more precise terminology to describe extreme COVID-19 illness caused a noticeably lower decline.[35]

## COVID-19 Rapid Antigen Test Diagnostic Adequacy Using Uncontrolled Self-Sampling

Three quick tests for antigens using nose self-samples all showed lower sensitivity after the development of Omicron, however, only the clinical test showed statistical significance. The effectiveness of quick antigen testing to detect SARS-CoV-2. 1–5 seemed promising. The tests can be carried out in a variety of situations without laboratory facilities, need little equipment, and give results in 15–30 min. Rapid antigen tests are now commonly available as over-the-counter assays, despite the fact that they should only be utilized by qualified specialists. Self-testing reduces the bar for testing and allows people to receive an outcome without the guidance of a certified professional.[36]

## The Correlation between the COVID-19 Vaccine and Hospitalization in Patients Taking Immunosuppressive Drugs

Patients who were taking immunosuppressive DMARDs or glucocorticoids had a greater incidence of COVID-19-associated hospitalization and SARS-CoV-2 illness than those who were not. Those patients who had an organ or bone marrow transplant were more likely to become ill and need hospitalization, despite receiving either vaccination they were still at high risk. The mRNA-1273 and BNT162b2 vaccines had an effect on COVID-19-related hospitalization brought on by the Omicron variant in individuals using immunosuppressants and can offer some protection against Omicron infection. The mRNA-1273 and BNT162b2 vaccinations offered superior defense against COVID-19-related hospitalization in people whose immune systems were inhibited throughout the Omicron-dominant wave SARS-CoV-2. In addition, any of these two vaccines was very efficient in lowering the likelihood of ICU admission. Both three and two doses of either vaccination were significantly protective against COVID-19 hospitalization in both immunocompetent and immunosuppressed individuals. All patients on immunosuppressive drugs such as DMARDs or glucocorticoids, as well as those who have had organ or bone marrow transplants, significantly had a higher probability of hospitalization for COVID-19, therefore a fourth dosage of vaccination would be justified.[37]

## The Variation in COVID-19 Mortality Risk, As Well As Immunization History, Comorbidities, and Other Factors

There were 53 deaths without COVID-19 and 128 deaths involving COVID-19 among those who have Omicron infection, meanwhile, in those infected with the Delta, there were 189 and 28, respectively. The likelihood of dying from COVID-19 was 67% less likely to happen depending on sociodemographic characteristics, vaccination status, and comorbidity differences, following infection with the Omicron BA.1 variant in comparison to the Delta variant. Regarding all age groups, the probability of dying from COVID-19 infection with Omicron infection was lower than Delta. The relative risk is lower in younger individuals because age has a substantial impact on fatality risk difference, with Omicron demonstrating a greater decrease in COVID-19 mortality than Delta for individuals between the ages of 18 and 59 and 60 and 69 years than for those who are 70 or beyond. In terms of gender and variant interaction, males exhibit a greater reduction than females in mortality risk for COVID-19. The categories used to categorize vaccination status were one dose, two dosages of the mRNA vaccine given by Pfizer or Moderna within 180 days, two dosages given by AstraZeneca within 180 days, unvaccinated, and booster. Regardless of age, receiving a booster lowered the death possibility from Omicron relative to Delta in comparison to receiving two dosages only. In South Africa, California, Canada, and the UK, the clinical seriousness of COVID-19 Omicron variation was way less severe than that of the Delta form. For all age categories, the probability of COVID-19-related mortality regardless of the number of comorbidities, Omicron infection was less than Delta. However, there was no proof that the number of comorbidities affected the relative mortality risk in a different way.[38]

## Parameters of Chronic Illness in COVID-19 Patients

Some people with systemic autoimmune rheumatic diseases (SARDs) may experience severe COVID-19 results, such as hospitalization and mortality. Data on rheumatic disease symptoms, comorbidities, immunization status, demographics, and medications were gathered. The electronic inquiry identified age, gender, race (Asian/Hawaiian/Pacific Islander, black, white, or other/unknown), and Hispanic race. Medical record review provided information on comorbidities such as interstitial lung disease, high blood pressure, diabetes, obesity, cardiovascular disease, and chronic bronchitis. The overall research samples' average age was 58.4 years (standard deviation [SD] 17.5). Overall, the samples were comprised 71.4% white, 11.2% black, and 3.6% Asian/Hawaiian/Pacific Islander people. The proportion of black or Hispanic SARD patients who tested positive for COVID-19 dropped. High blood pressure was the most prevalent coexisting condition (43.8%). At the time of infection, the vaccination status of the overall sample was 64.7% pre-vaccination/not vaccinated, 3.5% partly immunized, 15.7% two-dose mRNA or one-dose J&J, and 16.1% further dosage.

## Outcomes of Treatment and Severe COVID-19

Neutralizing monoclonal antibodies (12.6%), remdesivir (14.2%), and dexamethasone (13.2%) were the most widely used therapies for COVID-19. To treat COVID-19 in patients with SARD, few were given tocilizumab (1.0%), baricitinib (0.2%), or regenerative plasma (0.5%) (Figure 8). Three hundred ninety-nine individuals (or 27.5%) had a severe COVID-19 composite outcome, which included hospitalization or death. There were recorded 60 (4.1%) deaths and 391 (27.0%) hospitalizations. Individuals with serious COVID-19 have an age average of 66.9 years (SD 19.1), 76.3% being female, 10.2% having interstitial lung disease, 37.3% having rheumatoid arthritis, 47.5% using glucocorticoids, 18.6% on methotrexate, and 15.3% taking rituximab. Several patients had significant comorbidities in addition to SARDs, but they were also receiving therapies that substantially reduced their immune response to vaccines and infections (e.g., B cell depletion). As a result, attributing the impact of underlying SARD and immunosuppression is challenging. Throughout the calendar years, SARD patients who had severe COVID-19 made up less of the total population. Each calendar period's overall percentage of serious COVID-19 cases was 119 (45.6%), 144 (29.3%), 41 (33.3%), 36 (20.9%), and 59 (14.7%) in the early COVID-19, early treatment, fast vaccination, further vaccination, Delta wave, and Omicron wave times, accordingly.[5]

# DISCUSSION

In Shanghai, there were outbreaks of SARS-CoV-2 Omicron BA.2 between February 26 and June 30, 2022. These outbreaks' clinical severity and disease burden were estimated. In comparison to the general population, the aged people had much higher rates of severe/critical infections and mortality. Through a city-wide lockdown, transportation restrictions, school closures, frequent and thorough nucleic testing, and medical aid from other provinces, control of the outbreak was

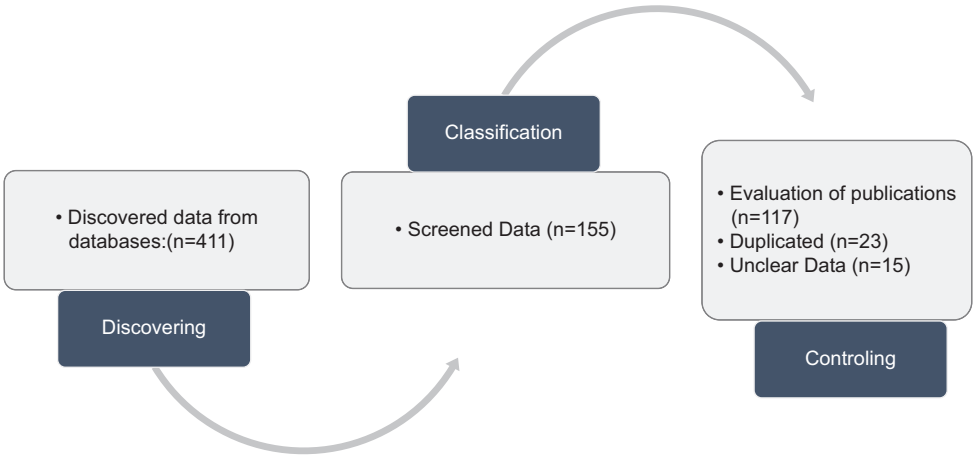


**Figure 1:** Study flowchart. This graph displays the various observations used in analyzing throughout the various subsections of the finding part. Utilizing the following MESH or keywords, studies were discovered using PubMed, Scopus, Google Scholar, and medRxiv. Transmission

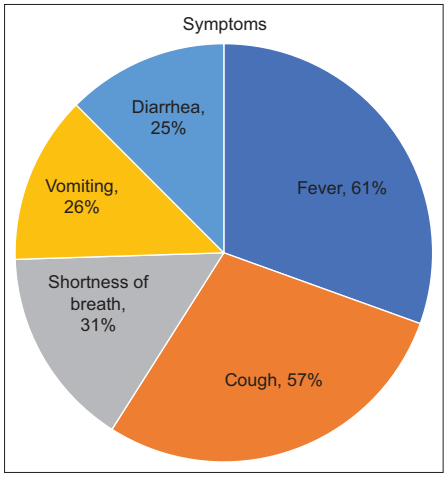


**Figure 2:** Hospitalization percentage of children with COVID-19

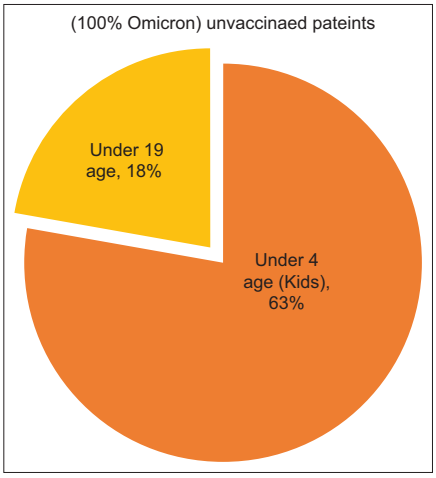


**Figure 4:** Unvaccinated kids and teenagers' percentage

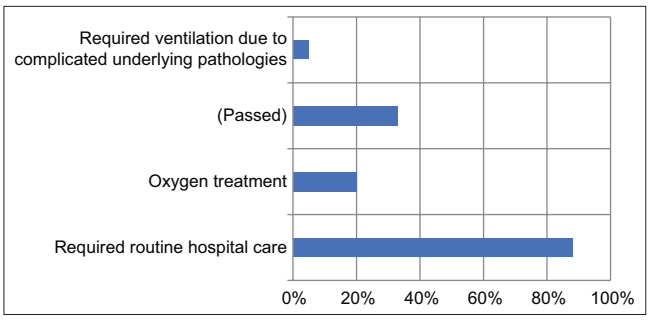


**Figure 3:** Proportion of patient hospitality status

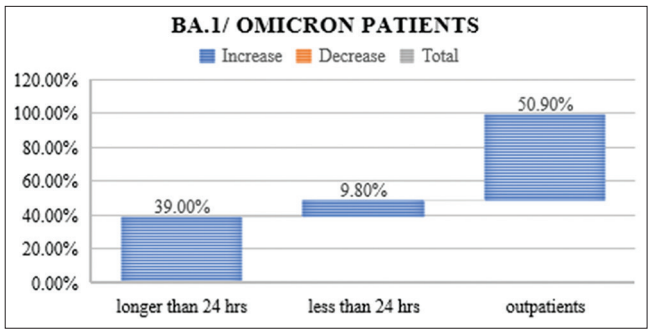


**Figure 5:** Severe acute respiratory syndrome coronavirus 2 infections and hospitalizations percentage in Omicron BA.1 and BA.2

attained. Shanghai has a greater rate of primary and booster vaccination coverage than Hong Kong, particularly among those 65 and older. To prepare for future COVID-19 waves that may occur, Shanghai has to increase immunization rates, especially among older persons with a history of persistent underlying illnesses. For the Omicron BA.2 epidemics that will occur in Shanghai between February and June of 2022, sickness load and severity in clinical terms were estimated. When compared to other contexts and countries, we found lower outbreak burden and death, showing the significance of Shanghai's effective outbreak containment measures.[17]

A substantial rise in SARS-CoV-2 positive and related COVID-19 hospitalizations among young people including kids and adolescents was found in the South African district of Tshwane. This rise resulted from the strong communal transmission and the quick relocation of the Delta type by the Omicron type commencing in mid-November 2021. SARS-CoV-2s' Omicron variety has been referenced with

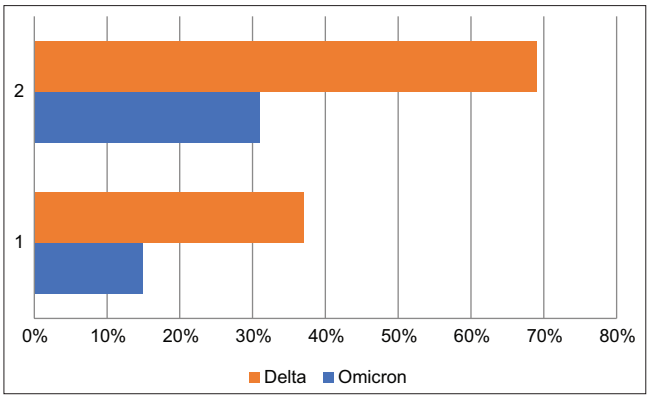


**Figure 6:** Pneumonia varieties and immunization status

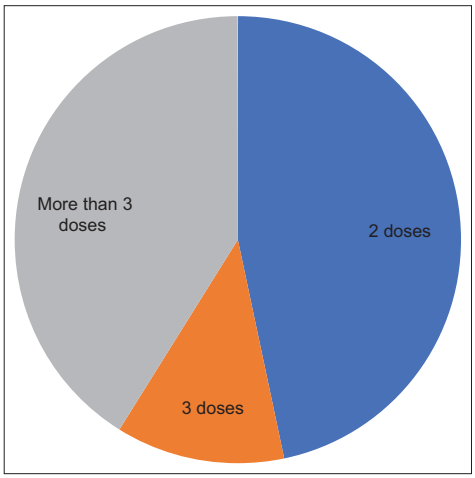


**Figure 7:** The influence of vaccination on clinical treatment outcomes during the omicron

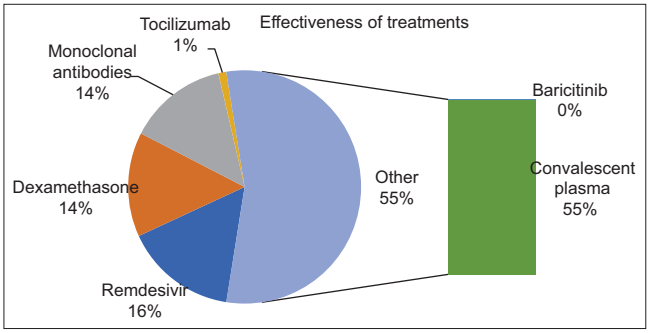


**Figure 8:** Treatment outcomes and severe COVID-19

poorer antibody neutralization, increased infectiousness, decreased vaccination effect, and a greater risk for recurrence in comparison to the Delta form. Children hospitalized with COVID-19 were diagnosed as 36% incidental cases, and another 20% were contributory diagnoses (not the major diagnosis), showing the virus's quick spread throughout the neighborhood. A number of factors, including the unavailability of childhood immunization, the greater percentage of prior exposure, and the innate immunity of adults being superior to that of infants are thought to be associated with an excessive infection of the Omicron variant of SARS-CoV-2, and children usually do not put on face masks as adults frequently do. Viral variations with high transmissibility spread more readily when total population immunity is low, but immune evasion features of a virus play a greater role in populations with a higher immunity. The vast majority of children with COVID-19 did not develop serious illnesses, which was encouraging, and a substantial portion of diagnoses was made accidentally. However, considering that this population is still uninfected in many countries, the quick rise in pediatric cases shows that hospitals should be ready for extremely contagious variants of SARS-CoV-2 that could cause a sudden surge in pediatric cases and hospitalizations.[29]

Nineteen percent of our pediatric patients and only 45% of the adult patients who were hospitalized with BA.1 or BA.2 were identified to be the predominant COVID-19 cases. Compared to individuals with accidental COVID-19, those with the main COVID-19 had solid organ transplants considerably more frequently and showed much less BA.1. In addition, they appeared to be older than patients who simply had COVID-19, and they also had what appeared to be a greater 28-day in-hospital death rate. They had higher rates of COVID-19 vaccination in comparison to those who had accidental COVID-19.[31]

A case–case study revealed that pneumonia was 66% less probable to arise from Omicron variant infection than from Delta variant infection. Within 6 months of infection, the Delta variant's full primary immunization lowered the incidence of pneumonia by 52%. International investigations have shown that maximal viral loads are lower in people with Omicron infections than in patients with Delta infections, although variations did not reveal any differences. The co-occurring medical conditions among this study participant were high blood pressure, diabetes, cerebral vascular disease, coronary heart disease, asthma, and so forth. In comparison to Delta infection, Omicron infection has a lower chance of developing pneumonia.[14]

Comparing the fourth dosage with the third dosage resulted in lower marginal efficacy against all outcomes and it was discovered that a fourth dose provided more protection than a third dose. For instance, if long-term care residents who lack vaccinations experience catastrophic outcomes 10 times every 1000 resident weeks, a fourth dose of the vaccine is 86% effective, and a third dosage is 77% successful. Earlier research on the efficacy of the two injections of mRNA vaccinations in long-term care residents undertaken before the pandemic revealed greater immunization efficiency rates (71–82%) toward infection in comparison to the fourth dose. Our research revealed that the COVID-19 mRNA vaccine's fourth dosage dramatically improved protection against any SARS-CoV-2 infection, symptomatic illness, and care during Omicron duration.[32]

In a cohort of organ transplant patients, a prospective observational study was conducted during the Omicron wave which discovered late age and several comorbidities continue to be significant risk factors for serious illness. However, the reduced chance of developing a major disease in liver transplant recipients is probably due to low levels and dosages of maintenance immunosuppression. Over the course of their illnesses, many patients' immunosuppression levels decreased,

especially in those with more serious illnesses. In addition, we discovered that sotrovimab was effective at lowering the requirement for extra oxygen and hospitalization when administered within the 1st week of symptom onset.[33]

In comparison to earlier versions, the Omicron form is more contagious and immune to vaccination neutralization. Retrospective extraction of clinical features and outcomes from electronic health records with positive RT-PCR SARS-CoV-2 test findings was performed. COVID-19 immunization, particularly obtaining a booster dosage, correlated with a lower risk of ICU admission and lower chance of mortality while at the hospital among individuals who are 65 years or older and who are more likely to experience major difficulties while hospitalized. Hospitalizations during the Omicron period were correlated with reduced IMV and hospital fatalities as compared to hospitalizations during the Delta era. The higher population-level immunity imparted by vaccination may be the cause of the reduced illness severity seen during Omicron predominance. The severity markers were contrasted during Omicron-period hospitalizations among the four vaccination status categories including unvaccinated, partially immunized, totally immunized without a booster injection, and completely immunized with a booster injection. Increased infections among vaccination recipients during the Omicron dominance period were most likely caused by a combination of deteriorating vaccination-derived immunity with time and the Omicron variation's increased vaccine-neutralization resistance compared to the Delta variant. Hospitalized patients having other illnesses were younger than adults hospitalized for COVID-19. Among the 105 hospitalized patients for COVID-19, 39.0% exhibited hypoxemia, 51.4% had unusual chest radiography, and 63.8% had symptoms of the lower respiratory tract. Omicron variant illness still produces serious lower respiratory disease despite reported differences from the Delta. Less Omicron-period individuals got COVID-19 therapy than Delta-period patients, which may indicate a lower proportion of hypoxemia.[34]

It has been demonstrated that COVID-19 vaccinations are more effective toward severe Omicron efficacy estimates based on hospitalization in Omicron-infected individuals underestimate the COVID-19 sickness. The reason for this is due to the less COVID-19 vaccine effectiveness which is responsible for a higher percentage of hospitalizations than it is for its actual induction. There was greater vaccination protection against the development of Omicron infection to severe illness as well as hospitalization. When more exact diagnostic criteria for serious COVID-19 respiratory sickness were applied, such as respiratory distress signs (such as the need for oxygen, mechanical ventilation, and ICU hospitalization), the efficacy of the vaccine against hospitalization improved. The second method to evaluate vaccination protection against serious illness included observing the transition from an Omicron infection to a more serious effect, such as intensive care needing hospitalization and ventilation support. The efficacy of vaccination against severe Omicron illness can be assessed using fatal outcomes, although care should be considered to avoid misclassifying the result in death. Ecological assessments might also be beneficial. The present vaccine formulations may still be useful in avoiding the most severe disease forms, as evidenced by the vaccination's high standard of safety against the severe COVID-19 illness associated with Omicron. However, because Omicron future emerging variations, resist vaccine-induced immunity against infection, and exacerbations of chronic conditions caused by infections in susceptible individuals, it may result in a higher percentage of hospitalizations and mortality. It may be necessary to provide booster shots more often or to develop new vaccinations that will more effectively and long-lastingly prevent SARS-CoV-2 infection.[35]

For the identification of SARS-CoV-2, rapid antigen assays exhibit promising performance. Minimal equipment is needed for the tests, and they give results in 15–30 min. Self-testing without the guidance of a knowledgeable specialist reduces the bar for testing and enables anyone to get the results quickly and as soon as it is convenient for them. This, in turn, might aid in the early discovery and self-isolation of infected individuals, hence reducing community transmission. Sensitivity of three readily accessible SARS-CoV-2 fast antigen tests (Flowflex, MPBio, and Clinical test) spontaneous nasal sampling by oneself by symptomatic people reduced the total Omicron emergence. However, the clinical test was the only test that showed a significant statistical decline. In contrast to individuals who visited testing facilities for different reasons, confirmatory testers (those tested who could prove favorable self-test results) showed much greater sensitivities. Without the requirement for confirmation testing, an immediate self-isolation can be justified by a positive self-test result. Predictive values that were negative were significantly lower. Those with a negative self-test result should take the usual precautions because it is impossible to rule out a false negative result.[36]

Many conditions are treated with immunosuppressants, and it has been demonstrated that individuals taking glucocorticoids or immunosuppressive DMARDs were more likely than non-users to experience COVID-19-linked hospitalization and SARS-CoV-2 illness. It was proven that patients with an organ, or bone marrow transplant had a considerably higher chance of hospitalization for COVID-19 than those who had not, and suggested that all of the patients on glucocorticoids or immunosuppressive DMARDs might also require a similar prioritization for a fourth dosage as those patients. The mRNA-1273 and BNT162b2 vaccines are extremely effective toward COVID-19-associated hospitalization brought on by the Omicron variant and can offer some protection against Omicron infection in individuals utilizing immunosuppressants. Prioritizing and maintaining immunization records for immunosuppressant – using individuals are vital.[37]

Omicron has been shown to be less severe than Delta in terms of hospitalization and mortality. The chance of mortality from COVID-19 was 67% less for Omicron than for Delta after accounting for several possible confounding factors such as vaccination status and health conditions which was more evident in youthful people and men than females. For those individuals who received a booster, their chance of dying was much lower.[38]

Serious COVID-19, which is marked by hospitalization or death, is more likely to occur in patients with SARDs. In comparison to SARD individuals who had mild COVID-19, those who had severe COVID-19 tended to be unvaccinated. The initial Omicron wave, which contributed to the most significant

number of instances but the minimal chance of severe illness, the percentage of SARD individuals with serious COVID-19 has reduced. The findings revealed that, although certain SARD individuals on immunosuppressive drugs may be more likely to contract a new infection. Vaccination showed notable advantages for several of these SARS-CoV-2-infected individuals. Regardless of these results, some individuals with SARDs continue to encounter serious diseases, particularly those who are using immunosuppressive medications known to impair the body's response to infection and vaccination as well as those who have other significant comorbidities. However, advancements in COVID-19 treatment, diagnosis, and prevention may have enhanced patient outcomes in SARD cases.[5]

## CONCLUSION

The most commonly reported symptoms of COVID-19 included mood fluctuations, rashes, gastrointestinal problems, coughing, and lack of appetite among children aged 0–3 years old whereas children between the ages of 4 and 11 years most frequently had mood fluctuations, memory loss, attention issues, and rashes. Two days on average were spent in the hospital (range, 1–3).

Pneumonia is less likely to develop from an Omicron infection than a Delta infection. Both the administration of booster doses 6 months after receiving the initial vaccines and the first 6 months afterward were linked to a significantly decreased incidence of pneumonia.

Less Omicron-period patients needed to be admitted to the ICU than Delta-period patients did. In comparison to the Delta, the Omicron showed a larger variation in vaccination efficacy among hospitalized cases. Both three and two doses of either vaccination were significantly protective against COVID-19 hospitalization in both immunocompetent and immunosuppressed individuals. For all age categories, the probability of COVID-19-related mortality regardless of the number of comorbidities, Omicron infection was less than Delta. Overall, throughout the calendar year, SARD patients who had severe COVID-19 made up less of the total population.

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