DOI: 10.1111/jgs.17126

MODELS OF GERIATRIC CARE, QUALITY IMPROVEMENT, AND PROGRAM DISSEMINATION

Journal of the American Geriatrics Society

Management and outcomes of a COVID-19 outbreak in a nursing home with predominantly Black residents

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Funding information
Health Resources and Services Administration, Grant/Award Numbers: K01HP39479, T1MHP39062, U1QHP28728; National Center for Advancing Translational Sciences, Grant/Award Number: TL1TR002388; National Institute on Aging, Grant/Award Number: K23AG049106

Abstract

Background/Objectives: Few studies present clinical management approaches and outcomes of coronavirus disease 2019 (COVID-19) outbreaks in skilled nursing facilities (SNFs). We describe outcomes of a clinical management pathway for a large COVID-19 outbreak in an urban SNF with predominantly racial minority (>90% black), medically complex, older residents.

Design: Single-center, retrospective, and observational cohort study (March 1, 2020–May 31, 2020).

Setting and Participants: All subacute and long-term care residents at an urban SNF between March 1, 2020 and May 31, 2020 (Chicago, IL).

Intervention: A multicomponent management pathway was developed to manage a large COVID-19 outbreak in an SNF.

Measurements: Chart review was used to extract demographics, comorbidities, symptoms, lab results, and clinical outcomes over 12 weeks, which were summarized and compared between residents with and without COVID-19.

Results: A multicomponent clinical management pathway was used to care for residents with COVID-19, which included frequent scheduled clinical and laboratory evaluation, use of intravenous fluids, supplemental oxygen, antibiotics when indicated, and goals-of-care discussions. Of the 204 residents, 172 (84.3%) tested positive for SARS-CoV-2 during the 3-month period, with 50.5% symptomatic, 9.3% presymptomatic, and 24.5% asymptomatic, with a 30-day mortality rate of 15.7%. Predominant symptoms were low-grade fever >99 °F, anorexia, delirium, and fatigue. While in the facility, approximately one-quarter of residents experienced hypernatremia [Na > 145 mEq/L] (24.5%), acute kidney injury [Cr > 0.03 mg/dL or 1.5× baseline] (29.7%), or leukopenia [WBC < 4.8 1000/mm^3] (39.4%).

Conclusion: We present the first available clinical strategy guiding the medical management of a COVID-19 syndrome in an urban SNF, caring for largely black residents, which may lead to improved mortality.

KEYWORDS

COVID-19, nursing homes, race and ethnicity, SARS-CoV-2

INTRODUCTION

Older adults are disproportionally affected by coronavirus disease 2019 (COVID-19).[1-3] Hospitalization rates, risk of intensive care admission, and case fatality related to COVID-19 increase with age and comorbid illness.[1] Skilled nursing facilities (SNFs) that care for older, multimorbid residents are at high risk for severe outbreaks and poor outcomes related to COVID-19.[4,5] SNFs often have limited diagnostic and treatment capacity and are challenged by high asymptomatic and presymptomatic COVID-19 transmission rates.[6,7] COVID-19 outbreaks in SNFs are common,[8] and COVID-19 deaths in SNFs continue to represent about 40% of COVID-19 deaths in the United States.[9]

Furthermore, the COVID-19 pandemic has highlighted long-standing health disparities and inequity in the United States, with racial/ethnic minority populations, particularly black communities, experiencing higher rates of COVID-19 morbidity and mortality.[10-13] In some areas of the country, approximately 70% of COVID-19 deaths occur in black individuals who make up less than a third of the population.[11] SNFs with predominantly black and Latinx residents are more likely to experience outbreaks and higher mortality[14] than those with majority white population.[15-18] A study of a large cohort of COVID-19-positive SNF residents found that increased mortality from COVID-19 in black residents may be due to increased prevalence of COVID-19 in these facilities and the number of underlying comorbidities in the residents,[19] which highlights the need to develop and implement standardized clinical care policies to care for these residents who are most vulnerable.

There are guides that summarize a general approach to COVID-19 infection control in SNFs,[6,20] but literature guiding the clinical management of the COVID-19 disease and sequelae in SNFs remains sparse. Most COVID-19 management literature has focused on optimizing hospital-based management.[21-24] Many of the alternative respiratory support mechanisms (e.g., prone ventilation, hood ventilation) trialed in the hospital[25] are not possible in the SNF. Ongoing novel pharmacotherapy trials[26-30] largely target hospitalized or ambulatory patients, with few trials in SNFs. The equivalent literature on the clinical management of COVID-19-infected residents in the SNF is limited. SNFs continue to care for ongoing surges of COVID-19 driven by community spread and new mutations where infection and death rates may be as high or higher than in the spring of 2020.[31] As healthcare organizations shift lower-acuity COVID-19 patients from the hospital to long-term acute care hospitals or hospital-at-home models to mitigate the strain on acute care settings,[32,33] it is imperative to design robust clinical care management pathways to care for COVID-19-positive patients in SNFs.[34]

The objective of this manuscript is to: (1) present and summarize a novel clinical management pathway

Key Points

- We describe a characteristic COVID-19 syndrome during a COVID-19 outbreak in a skilled nursing facility (SNF), which includes low-grade fever, hypoxia, delirium, anorexia, hypernatremia, and acute kidney injury.
- We present a novel clinical management pathway based on this COVID-19 syndrome, which includes scheduled and frequent clinical assessments; goals-of-care discussions; serial laboratory evaluation; and intravenous fluids, antibiotics, and oxygen as needed.
- This clinical management pathway, which was developed from clinical experience and consensus, may result in reduced hospitalizations and improved mortality outcomes and serve as a template for managing infectious outbreaks in SNFs.

Why Does this Paper Matter?

The COVID-19 pandemic has disproportionally impacted nursing homes, particularly those with black/Latinx residents. We present a novel clinical management pathway for a COVID-19 outbreak in an urban nursing home with predominantly black residents that may lead to improved mortality outcomes.

administered during a large COVID-19 outbreak at an urban SNF with a medically complex, predominantly black population and (2) to describe the demographics, clinical characteristics, course, and outcomes of the population in the SNF over a 12-week interval (March 1, 2020–May 21, 2020) during which the pathway was implemented shortly after outbreak onset.

METHODS

Facility and study participants

This initiative was centered in a >200-bed SNF in Chicago, IL. The initial eligible cohort consisted of all subacute and long-term care residents in a single SNF ($n = 209$) who were residing in the facility between March 1, 2020 and May 31, 2020; of these, 204 residents were included for data analysis based on the completion of a SARS-CoV-2 polymerase chain reaction (PCR) nasopharyngeal test. There were no new admissions during this time due to facility restrictions in the setting of the COVID-19 outbreak.

Study design

A retrospective chart review of the electronic medical record (EMR) at the SNF (PointClickCare®) and the affiliated academic medical center (Epic© 2020 Epic Systems Corporation) was conducted by a trained research assistant (JG) and a physician (KJB) and was adjudicated by another physician (LJG). Data extracted from the nursing facility EMR included clinical management decisions and the clinical characteristics of all residents (until hospitalized or discharged) during a COVID-19 outbreak between March 1, 2020 and May 31, 2020. Outcomes of hospitalized residents were extracted from the nursing facility EMR, as well as the affiliated academic medical center EMR.

Demographics

Demographics were collected and included age (as of March 1, 2020), gender, and race as reported in the EMR.

Comorbidities

Comorbidities including cognitive impairment/dementia, cardiac disease, hypertension, diabetes mellitus, obesity (body mass index >30), chronic pulmonary disease, and immunosuppression (Table 1) were collected via chart review of provider notes and ICD-10 (International Classification of Diseases, Tenth Revision) codes in the EMR.

Clinical characteristics

Vital signs including temperature, blood pressure, heart rate, respiratory rate, and oxygen saturation (O2) were collected from nursing flow sheets and provider notes. Symptoms and clinical management interventions were extracted from provider documentation. Laboratory data (complete blood count [CBC], comprehensive metabolic panel [CMP]) and results of chest radiographs were collected by review of scanned reports from the facility-contracted laboratory.

Goals of care and code status

Documentation of goals-of-care conversations as attempted or held, as well as code status obtained from either documentation or scanned forms for physician orders for life-sustaining treatment, were extracted from the SNF EMR.

Clinical outcomes

Clinical outcomes including hospitalization, discharge disposition, and 30-day mortality were determined from a chart review of provider and nursing notes at the SNF, the associated affiliated academic hospital, and hospital discharge paperwork sent to the SNF from other local hospitals. In addition, the facility collected all 30-day mortality and discharge disposition outcomes from all hospitalizations as mandated for state reporting.

INTERVENTION: CLINICAL MANAGEMENT & RECOVERY OF COVID-19 (FIGURE 1)

A multicomponent management pathway was developed for a large COVID-19 outbreak and disease course in the SNF. This pathway, including thresholds for action and clinical management recommendations, was developed by group consensus within the nine-provider clinical care group who were managing the SNF residents at the time of the COVID-19 outbreak.

General infection control

A facility infection control pathway was implemented in accordance with the most current CDC guidelines at the time, which included universal masking, use of appropriate personal protective equipment (PPE), and routine screening for influenza-like illness symptoms of both residents and staff.[35,36] Diagnostic testing was performed using the SARS-CoV-2 Real-Time Reverse Transcriptase

TABLE 1 Facility demographics

	Overall	COVID-19 positive	COVID-19 negative	*p* value
Total (*N* [%])	204 (100)	172 (84.3)	32 (15.7)	
COVID-19 positive symptomatic		103 (50.5)		
COVID-19 positive presymptomatic		19 (9.3)		
COVID-19 positive asymptomatic		50 (24.5)		
Demographics				
Age [mean (SD)]	75.2 (12.0)	75.4 (12.1)	74.2 (11.3)	0.59
Race [*N* (%)]				0.11
Black	192 (94.1)	164 (95.3)	28 (87.5)	
White	9 (4.4)	5 (2.9)	4 (12.5)	
Native American	1 (0.5)	1 (0.6)	0 (0.0)	
Unknown	2 (1.0)	2 (1.2)	0 (0.0)	
Female gender [*N* (%)]	117 (57.4)	99 (57.6)	18 (56.3)	0.89
Medicare [*N* (%)]	160 (78.4)	135 (78.5)	25 (78.1)	0.96
Medicaid [*N* (%)]	194 (95.1)	164 (95.4)	30 (93.8)	0.66
Cognitive impairment/dementia	138 (67.7)	120 (69.8)	18 (56.3)	0.13
Cardiac disease[a]	88 (43.1)	72 (41.9)	16 (50.0)	0.39
Hypertension	184 (90.2)	157 (91.3)	27 (84.4)	0.23
Diabetes mellitus	80 (39.2)	71 (41.3)	9 (28.1)	0.16
Obesity (BMI >30 kg/m^2)	33 (16.2)	31 (18.0)	2 (6.3)	0.12
Chronic pulmonary disease[b]	69 (33.8)	55 (32.0)	14 (43.8)	0.20
Immunosuppressed[c]	21 (10.3)	17 (9.9)	4 (12.5)	0.75

[a]Coronary artery disease/heart failure.
[b]Including diagnosis of asthma, chronic obstructive pulmonary disease, sarcoidosis, obesity hypoventilation syndrome, restrictive lung disease, bronchitis, chronic respiratory failure with hypoxia, emphysema, idiopathic pulmonary hemosiderosis, laryngeal stenosis, and obstructive sleep apnea.
[c]Including HIV/AIDS, chronic rheumatologic diagnoses on immunosuppression, Sjogren syndrome, active malignancy with or without treatment, hepatitis B, hepatitis C, and multiple sclerosis.

(RT)-PCR nasopharyngeal swab (Roche). Point prevalence testing was conducted in the facility twice, 7 days apart. Based on the results of prevalence testing, residents were cohorted using a novel three-tiered cohorting strategy into "positive," "negative-exposed," and "negative-cleared," which has been described previously.[36]

Every resident present in the facility at the time of the first confirmed COVID-19 case was placed on a line list for clinical monitoring.[37] A shortened list of residents with an active COVID-19 infection was maintained on a whiteboard in the locked physician workroom for daily review by the on-site providers.

Clinical evaluations in COVID-19 positive residents

Primary medical management of all residents was consolidated under a nine-clinician provider group (six physicians, an Advanced Practice Nurse (APN), a physician assistant (PA), and a registered nurse (RN)). Residents who tested positive for SARS-CoV-2 received an initial clinical evaluation, including provider exam, labs (CBC and CMP), vital signs every 4 hours, and a chest radiograph if respiratory symptoms or hypoxia (O2 < 93%) were present. A standard COVID-19 order set was entered: (1) use nasal cannula oxygen to maintain O2 > 92%; (2) Place intravenous (IV) access if IV fluids are ordered; and (3) initiate contact and droplet precautions. Anticoagulation management was left to the individual clinician's discretion. Lab evaluations were ordered every week in all COVID-19-positive residents and more frequently for any lab derangements. A provider exam was conducted weekly in COVID-19-positive residents or more frequently if clinically indicated, an increase from the 30-day subacute or 60-day long-term care resident evaluations mandated by Centers for Medicare & Medicaid Services (CMS).[38]

COVID-19 syndrome management

Subsequent management decisions were based on clinical status and laboratory results. Leukocytosis (white blood cell count [WBC] >10.8 1000/mm^3) triggered workup of

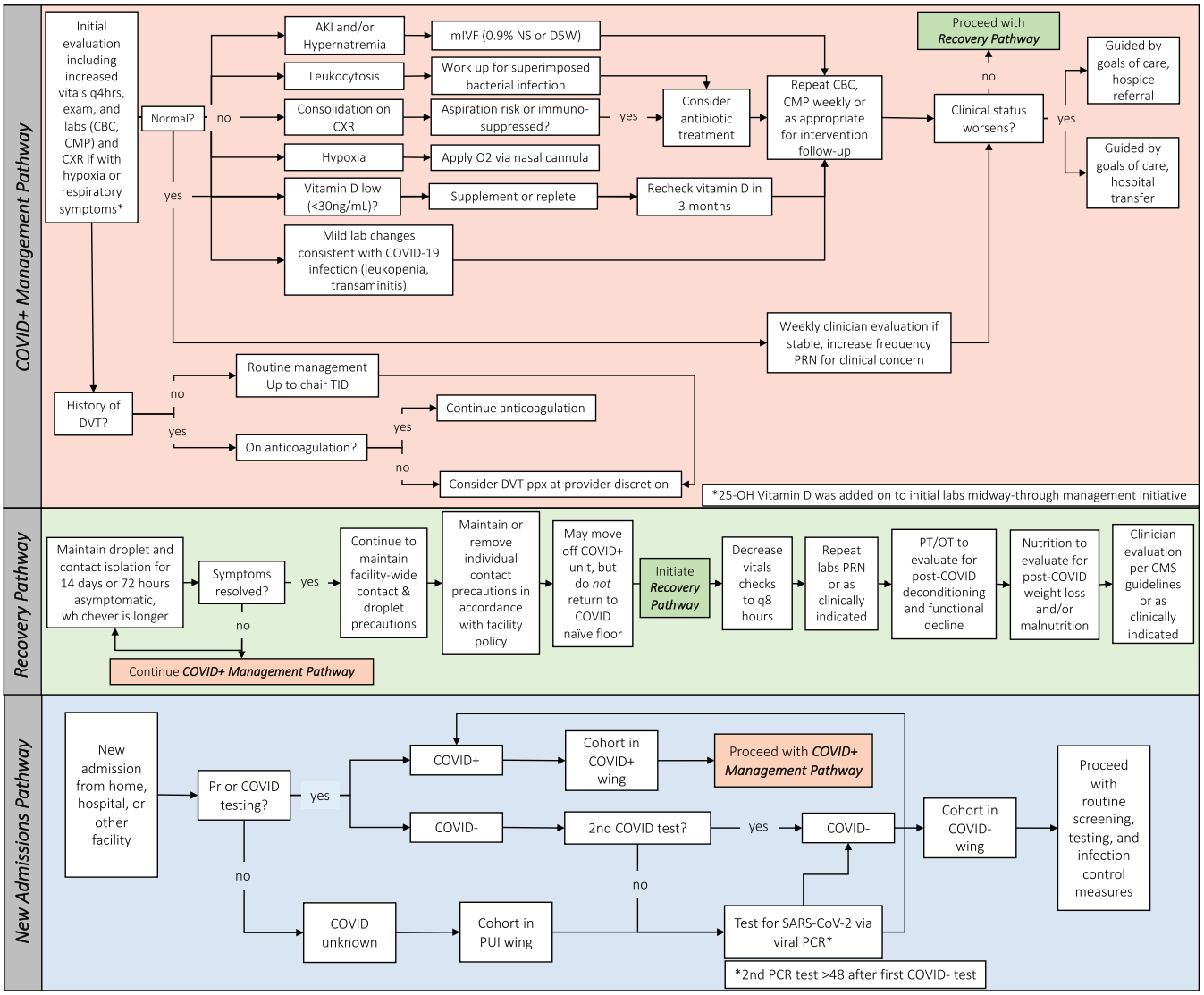

FIGURE 1 Clinical management, recovery, and admissions algorithm. Clinical pathways for the management and recovery of COVID-19-positive residents in a skilled nursing facility, as well as a pathway for new admissions to the facility

a concomitant bacterial infection, and an appropriate antibiotic regimen was initiated as indicated. If a discrete infiltrate was noted on chest radiograph, appropriate antibiotic coverage was initiated if the patient had a history or risk factors for aspiration pneumonia, immunosuppression, or if leukocytosis was present. If acute kidney injury (AKI) (Cr > 0.03 mg/dL or 1.5× baseline) and/or hypernatremia (Na > 145 mEq/L) was present on CMP, a midline IV was ordered (peripheral IV was used for residents with ≥CKD3), and isotonic IV maintenance fluids were started. A standard order for IV fluids ran for 3 days. During pathway design, a decision was made not to implement widespread use of hydroxychloroquine, azithromycin, or steroids based on available evidence at the time, although providers could decide to prescribe these therapeutics at their discretion after discussion of risks and benefits with residents and family. Providers were allowed to use individual judgment to deviate from the pathway as warranted based on the specific clinical scenario and the provider's knowledge of the resident.

Hospitalization or hospice indications

A resident was transferred to the hospital if it was within the discussed goals of care and if they exhibited clinical instability not responsive to facility interventions. Residents with worsening clinical status were enrolled in hospice care if this was in line with stated goals of care. Goals-of-care discussions and clinical care updates including SARS-CoV-2 test results were conducted regularly with families via a telephone tree that has been described previously.[39]

Recovery

Droplet/contact isolation was maintained for 14 days with an additional 72 hours to ensure asymptomatic status or longer if symptoms persisted. After the isolation period, transmission-based precautions were discontinued. Residents were moved off the active COVID-19 unit but not returned to the COVID-19 naïve unit. With transition to the recovery pathway, vital sign checks were decreased to every 8 h, lab draws were performed only as clinically indicated, and clinician evaluation returned to every 30–60 days per CMS guidelines[38] (Figure 1). Physical and occupational therapies were consulted for functional decline, and nutrition was consulted for weight loss[40] only after isolation due to limited PPE supplies.

Admissions and reopening

The facility closed to new admissions for 60 days while the outbreak was managed. Residents in the facility at the time of outbreak who required hospitalization were allowed readmission at hospital discharge, but no new admissions were accepted. After COVID-19 response measures were implemented, the facility reopened to new admissions (both COVID-19 positive and negative). At that point, a new admission pathway was integrated into the evaluation and management processes (Figure 1).

Statistical analysis

Summary statistics are presented for the study sample by COVID-19 status. The statistical significance of differences in clinical characteristics and outcomes between residents with COVID-19 versus those without were assessed using t-tests for continuous measures or chi-squared/Fisher's exact test for categorical measures. All analyses were conducted in Stata Version 16 (StataCorp LLC, College Station, TX). This study was approved by the Institutional Review Board at the University of Chicago.

RESULTS

Sample characteristics and COVID-19 prevalence (Table 1)

There were 209 residents eligible to be included in the cohort during the study period. Five residents were excluded from analysis due to unknown COVID-19 status (individuals who died prior to widespread availability of SARS-CoV-2 testing). The final cohort ($n = 204$) had a mean age of 75.2 years [SD 12.0], and 57.4% were female. The population was comprised of predominantly black residents (94.1%). The majority of residents were insured by Medicare (78.4%) and/or Medicaid (95.1%). Hypertension (90.2%) and cognitive impairment (67.7%) were the most common chronic conditions present, followed by cardiac disease (43.1%) and diabetes (39.2%). A total of 172 residents (84.3%) tested positive for SARS-CoV-2 over 12 weeks. Age, race, gender, and medical comorbidities did not differ between the COVID-19-positive and COVID-19-negative cohorts.

Presenting COVID-19 symptoms

Among those testing COVID-19 positive (n = 172), 50.5% were symptomatic (had symptoms prior to SARS-CoV-2 PCR swab), 9.3% were presymptomatic (developed symptoms after a positive SARS-CoV-2 test), and 24.5% were asymptomatic (did not have or develop symptoms after a positive SARS-CoV-2 test up to 14 days) (Table 2). Of the symptomatic residents, the most common presenting symptoms were temperature elevation >99 °F (64.8%), hypoxia (34.4%), anorexia (50.0%), delirium (49.2%), and fatigue (39.3%). A substantial number of COVID-19-positive residents had lab abnormalities noted when in the nursing facility, including leukopenia (39.4%), aspartate aminotransferase (AST)-predominant transaminitis (34.7%), hypernatremia (24.5%), and AKI (29.7%). Only 8.4% had a documented leukocytosis.

Clinical management of COVID-19

Of all residents with COVID-19 ($n = 172$), 64.5% were managed exclusively in the facility (Table 3). Among the COVID-19-positive residents, 18.6% received IV fluids, 27.3% received supplemental oxygen, and 21.5% received antibiotics in the facility. Chest radiographs were ordered in 88 of the COVID-19-positive residents; of these, 27 residents (30.7%) had an abnormal chest X-ray.

Goals of care

A goals-of-care conversation was documented as held or attempted in 54.4% (111/204) of all residents. More conversations were attempted or held in COVID-19-positive residents (103/172 vs 8/32, $p < 0.001$). Although 49 of the 204 residents had a code status of do not resuscitate in the 30 days following their last COVID-19 test, there was no significant difference in code status between the two groups ($p = 0.45$) (Table 2).

TABLE 2 COVID-19 symptoms, laboratory abnormalities, and clinical interventions

	N	%
Symptom prevalence in symptomatic COVID-19-positive residents ($N = 122$)		
Vital sign changes		
Fever >99 °F	79	64.8
Hypoxia <93% or change from baseline	42	34.4
Tachycardia >100 bpm	21	17.2
Hypotension <100/60 or MAP <65	13	10.7
Subjective symptoms		
Anorexia	61	50.0
Delirium	60	49.2
Fatigue	48	39.3
Cough	27	22.1
Shortness of breath	14	11.5
Diarrhea	8	6.6
Nausea/Vomiting	7	5.7
Myalgias	6	4.9
Sore throat	5	4.1
Anosmia/Ageusia	1	0.8
Abdominal pain	0	0.0
Lab/imaging abnormalities in COVID-19-positive residents[a]		
Leukocytosis (WBC > 10.8 1000/mm^3)	13/155	8.4
Leukopenia (WBC < 4.8 1000/mm^3)	61/155	39.4
Transaminitis (AST/ALT > lab cutoff)		
AST > 22 U/L	51/147	34.7
ALT > 35 U/L	22/146	15.1
Hypernatremia (Na > 145 mEq/L)	38/155	24.5
AKI (Cr >0.03 mg/dL or 1.5× baseline)	46/155	29.7
Abnormal chest radiograph[b]	27/88	30.7
Interventions used in COVID-19-positive residents ($N = 172$)		
Oxygen supplementation	47	27.3
Intravenous fluids	32	18.6
Antibiotics	37	21.5
Exposure to novel therapeutics[c]	7	4.1
Goals of care and code status in all residents with a COVID test ($N = 204$)		
Goals-of-care conversation[d]	111	54.4
Code status of do not resuscitate (DNR)[e]	49	24.0

[a]Denominator varies depending on presence or absence of associated laboratory test.
[b]Chest radiograph ordered but not resulted (8/88, 9.1%).
[c]Novel therapeutics including steroids (1/7) or hydroxychloroquine (6/7).
[d]103/172 COVID-19-positive residents had a documented goals of care conversation versus 8/32 COVID-19-negative residents ($p < 0.001$).
[e]43/172 COVID-19-positive residents had a code status of DNR compared to 6/32 COVID-19-negative residents ($p = 0.45$).

Clinical outcomes of COVID-19

Hospitalization was required in 35.5% of COVID-19-positive residents, with the majority (77%) occurring at the academic hospital; 16.9% ($n = 29$) were readmitted to the facility, 3.5% ($n = 6$) were discharged to a different facility (SNF or long-term care hospital), and 2.3% ($n = 4$) were discharged from hospital to home (Table 3).

The 30-day mortality rate of residents with COVID-19 was 15.7% (27/172); 16 residents died in the hospital, 1 hospitalized patient was discharged to inpatient hospice, and seven residents died in the SNF on hospice.

DISCUSSION

To our knowledge, this is the first article describing a clinical management pathway for the COVID-19 syndrome during a large COVID-19 outbreak in an urban SNF. We present descriptive information of our clinical management approach to COVID-19 as tools that may be adopted and adapted by other facilities. These findings are particularly relevant to providers caring for high-risk, medically complex, older populations comprised of predominantly black residents.

Our observations of presenting symptoms associated with COVID-19 are relatively consistent with published data on COVID-19 presentation in SNFs. One paper published on a COVID-19 outbreak in an urban academic SNF noted that the most common COVID-19 clinical symptoms were anorexia (71.0%) and delirium (57.9%).[41] We similarly found high rates of anorexia (50.0%) and delirium (49.2%) as predominant presenting symptoms, a finding that may be related to the high prevalence (69.8%) of cognitive impairment in our sample. Furthermore, 64.8% of COVID-19-positive residents developed a temperature elevation >99 °F. These findings suggest that anorexia, delirium, and a lower fever threshold should be used to trigger testing in this group.

We observed the COVID-19 syndrome commonly included hypernatremia and AKI. This is possibly secondary to dehydration in the setting of delirium, fatigue, anorexia, or nausea, compounded by chronic conditions like dementia and exacerbated by social distancing measures limiting residents from common dining rooms, 1:1 mealtime assistance, and restricting family visitation. Although these laboratory derangements in hospitalized residents with COVID-19 have been reported,[42] the presence of these lab abnormalities in conjunction with COVID-19 in a SNF population has not, to our knowledge, been published previously.

SNFs are not exempt from the racial and socioeconomic segregation and inequity that contribute to the

TABLE 3 Resident disposition

Disposition	COVID-19 positive, *N* (%)	COVID-19 negative, *N* (%)	*p* value
Remained in facility	105 (61.0)	28 (87.5)	
Hospitalized			
Readmitted	29 (16.9)	1 (3.1)	
Discharged to different facility (skilled nursing facility (SNF) or LTACH[a])	6 (3.5)	0 (0.0)	
Discharged to home	4 (2.3)	0 (0.0)	
Deceased			
In hospital	16 (9.3)	1 (3.1)	
Inpatient hospice	1 (0.6)	0 (0.0)	
In SNF	3 (1.7)	0 (0.0)	
In SNF, hospice	7 (4.1)	0 (0.0)	
Discharged from SNF to home	0 (0.0)	2 (6.3)	
Discharged from SNF to home against medical advice	1 (0.6)	0 (0.0)	
Mortality	27/172 (15.7)	1/32 (3.1)	0.09

[a]Long-term acute care hospital.

ongoing disparities in the United States healthcare system.[43] Black individuals are more likely to be admitted to SNFs with more regulatory deficiencies,[44] lower staffing ratios, and greater financial instability.[45] As a result, residents of these facilities may experience variable care quality and have increased vulnerability to a healthcare crisis like a pandemic. Multiple studies have noted that larger nursing home size and higher percentage of black and Latinx residents are associated with both a higher probability of a COVID-19 case[16,17] and higher COVID-19 mortality.[14] Publications on COVID-19 outbreaks in SNFs have reported mortality rates ranging from 24% to 38.8%,[4,5,41,46,47] with more than three times the number of deaths in facilities with majority non-white residents.[14] Given this, it is crucial to design COVID-19 management strategies to improve outcomes in facilities that care for these vulnerable populations. Our mortality rate of 15.7% is much lower than other published mortality rates. Our clinical management strategy of a significant COVID-19 outbreak in a large SNF with a predominantly black population and access to tertiary-level hospital care at the partner academic medical center may have contributed to these improved clinical and mortality outcomes. However, given the inability to conduct a randomized controlled trial, we cannot definitively attribute our improved outcomes to our management pathway and tertiary care access.

There are aspects of our SNF that made this escalated care algorithm feasible. We had enough clinicians to expand staffing hours and consolidate care to one clinical team, proactive communication with receptive facility administration, and a partnership with our affiliated academic medical center. As part of the facility's administrative response, nursing and CNA ratios on the COVID ward were increased, and hazard pay was provided, which facilitated an increased ability to provide higher-level care. Facilities with different access and care models may have to modify these proposed COVID-19 management strategies to fit their specific clinical and administrative care structures. Facilities with limited clinical resources may benefit from partnership with an associated acute care hospital or health system when developing an outbreak management strategy.[48,49]

Limitations

This was a single-center retrospective, observational study, and thus, results may not be widely generalizable. However, our results align with previous studies and add evidence that most SNF residents with COVID-19 present with atypical symptoms. In addition, it is likely that symptoms may be underreported, either due to documentation inconsistency or the limited ability of a cognitively impaired SNF population to report their subjective experience. Ideally, such a clinical management pathway would undergo randomization in a clinical trial to demonstrate mortality reduction; however, this study design was not possible during a public health emergency. In addition, given the large proportion of COVID-19-positive residents, we were likely underpowered to show clinical differences between groups. Finally, as more is understood about the pathophysiology of the COVID-19 disease course, new medication regimens or treatment pathways

for COVID-19 may become more widely recommended for use, which were not accounted for in this pathway.

CONCLUSIONS AND IMPLICATIONS

We report the course of a COVID-19 outbreak at an SNF serving predominantly black, medically complex older adults. Even with vaccination, COVID-19 is likely to become a regular clinical syndrome in all healthcare settings, and a proactive management strategy for COVID-19 outbreaks in SNFs is imperative. This pathway encourages aggressive supportive care, including close clinical follow up, use of IV fluids for the treatment of dehydration, and treatment of concomitant bacterial infection. These interventions are feasible for SNFs managing COVID-19 outbreaks independent of affiliated hospitals or with limited access to novel therapeutics or ongoing trials. We have also demonstrated the feasibility and importance of conducting goals-of-care conversations and confirming code status with a large percentage of a SNF population during an infectious outbreak. The clinical management pathway reported here may act as a template that can be modified for use in other facilities or updated with new evidence.

ACKNOWLEDGMENTS

We thank the University of Chicago Section of Infectious Disease and microbiology lab; Kristen Wroblewski for statistical support; Tobias Spears, Senior Director and Assistant Dean for Diversity & Inclusion, for his thoughtful feedback; and Fran Walker, APN, TaNisha McSpadden, RN, and Whitney Herrig, PA, for their tireless and exemplary clinical service.

FINANCIAL DISCLOSURE

This work was supported in part by the Health Resources and Services Administration, an operating division of the U.S. Department of Health and Human Services (Grant U1QHP 28728 and Grant T1MHP39062), by the National Institutes on Aging (Grant K23AG049106), and the National Center for Advancing Translational Sciences of the National Institutes of Health (Award Number TL1TR002388).

CONFLICTS OF INTEREST

The authors have no competing interests of conflicts to declare.

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SPONSOR'S ROLE

The funding sources were not involved in the design, analysis, or reporting of the results.

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How to cite this article: Beiting KJ, Huisingh-Scheetz M, Walker J, et al. Management and outcomes of a COVID-19 outbreak in a nursing home with predominantly Black residents. *J Am Geriatr Soc*. 2021;69:1155–1165. https://doi.org/10.1111/jgs.17126