

Frail older adults with pre-symptomatic SARS-CoV-2 infection: clinical course and prognosis

**Yochai Levy, M.D.^{1,2,5}, Adi Turjeman Msc.^{2,3}, Lisa Cooper M.D.^{1,2}, Nadya Kagansky M.D.^{2,4},
Tatiana Nagulevich M.D.⁵, Tamari Snir M.D.⁵, Avital Hershkovitz M.D.^{2,6}, Avraham Weiss
M.D.^{1,2}, Yichayaou Beloosesky M.D.^{1,2}, Yaara Leibovici Weissman M.D.^{2,7}**

¹Department of Acute Geriatrics, Rabin Medical Center, Beilinson Campus Petah Tikva, Israel; ²Sackler Faculty of Medicine, Tel Aviv University; ³Research Authority, Rabin Medical Center; ⁴Shmuel Harofeh Medical Center; ⁵Geriatric Center Golden-Care, Ness Ziona ;⁶Department of Geriatrics, Beit Rivka Geriatric Rehabilitation Center, Petach Tikva; ⁷Internal Medicine Department E, Rabin Medical Center, Beilinson Campus

COVID-19 is a geriatric pandemic

מספר המתים מקורונה בחלוקה לקבוצות גיל
(לפי 10,693 מקרים)

79-70	2,642	24.71%
89-80	3,606	33.72%
90+	1,972	18.44%

* מתוך אתר כללית מעודכן ל-03/05

חולים קשה ל-100 אלף איש: מחוסנים לעומת לא מחוסנים

הנתונים מתייחסים למי שמאושפזים בבתי החולים ב־3 במאי 2022.

בני 60 ויותר

21.6 חולים קשה שאינם מחוסנים.

14.4 חולים קשה מחוסנים ללא תוקף.

6.7 חולים קשה מחוסנים.

עד גיל 60

0.7 חולים קשה שאינם מחוסנים.

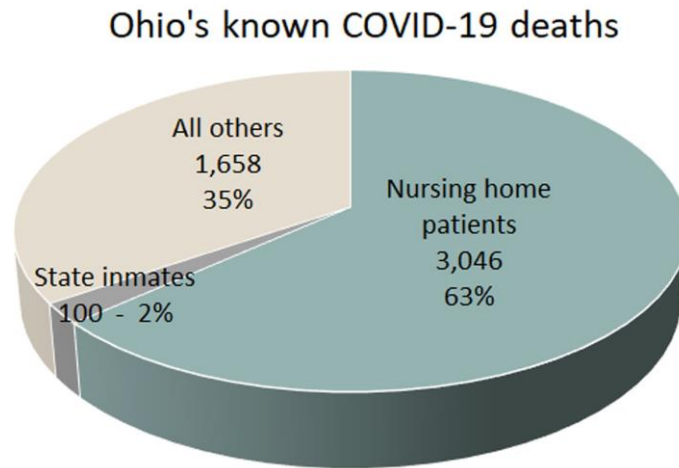
0.6 חולים קשה מחוסנים ללא תוקף.

0.1 חולים קשה מחוסנים.

More precise a nursing home pandemic

Nursing homes represent more than 1 in 4 COVID-19 deaths in U.S.

As federal data collection becomes more robust, a clearer picture is emerging of the ravages of COVID-19 in nursing homes.



Source: Ohio Department of Health

RICH EXNER/CLEVELAND.COM

"ספרד: שיא מתים ביממה, קשישים ננטשו בבתי אבות
514 בני אדם מתו מקורונה ביממה, המספר הגבוה ביותר
מתחילת ההתפשטות בספרד, וקרוב ל-40,000 נדבקו. חיילים
נשלחו לסייע בחיטוי בבתי אבות: "צוותים נטשו כשהתגלה הנגיף,

קשישים נמצאו מתים במיטות" ynet יריעות אחרונות

"המחדל בבתי האבות"

למרות שהאוכלוסייה המבוגרת נמצאת בקבוצת סיכון, הקשישים
בבתי האבות לא זכו להגנה מספקת מנגיף הקורונה. משרד הבריאות
סירב לאשר בדיקות נרחבות והתעקש שבידוד מספיק עבורם. כאשר
כבר הסכים - בחלק מהמקומות זה היה מאוחר מדי. והנתון העגום
משיא המגפה מעיד על המחדל: כשליש מהמתים מהנגיף בישראל

התגוררו בדיור מוגן"



Israel unique policy

- Routine screening for SARS-CoV-2 among nursing home residents.
- Most dependent, asymptomatic residents positive for SARS-CoV-2 were isolated and managed in designated COVID-19 units, of skilled nursing homes.
- This policy was meant to ensure better infection control while allowing personal contact between residents who are positive for SARS-CoV-2, thus minimizing the potential harms of social isolation.
- Furthermore, the residents received treatment from experienced staff members, accustomed to working with personal protective equipment (PPE).

Introduction

- In this study, we present the outcomes of frail older adults, isolated in such designated units.
- Our hypothesis was that this frail population would suffer worse outcomes.
- Furthermore, we stipulated that due to their very low performance status and extreme frailty, age would be a weaker risk factor for COVID-19 adverse events.

Methods

Study Design and Participants

- A retrospective, observational cohort study of older adults, admitted to designated COVID-19 units, in “Golden Care”, a chain of skilled nursing homes in Israel, between March 30 and November 12, 2020.
- The COVID-19 units were created in the skilled nursing homes, using isolated areas with designated multidisciplinary staff trained to use complete PPE.
- Participants were found positive for SARS-CoV-2 and were asymptomatic at time of admission.

Methods

Study Design and Participants

- All residents needed continuous supervision and care due to major functional and/or cognitive impairments, indicating severe frailty according to the Clinical Frailty Scale.
- Residents received care for their basic activities of daily living needs. If they developed COVID-19-related symptoms ,they received medical care inside the units.
- After recovery from COVID-19, residents returned to their prior accommodations.

Methods

Inclusion and Exclusion Criteria

- Inclusion: residents admitted to the designated COVID-19 units, who were asymptomatic (free of COVID-19 symptoms) upon admission.
- Exclusion: admission from acute care facilities, age < 65 years, stayed for more than > 40 days.

Methods

Disease and Recovery Definitions

- SARS-CoV-2 tests were performed using PCR analysis of throat swabs.
- COVID-19 symptoms were defined as fever $> 38^{\circ}\text{C}$, new respiratory complaints, or a new decrease in pulse oxygen saturation (SpO_2).
- Severe disease requiring hospitalization was defined as respiratory distress or $\text{SpO}_2 < 92\%$, unresponsive to O_2 , significant change in level of conscience, or hemodynamically unstable patients.
- Recovery definition changed according to national policy.

Methods

Data Collection

- Data were retrieved from electronic medical records and included demographics, comorbidities, performance status, and chronic medications.
- **Our primary outcome was a composite outcome of mortality and hospitalization in residents staying up to 40 days in the designated units.**

Methods

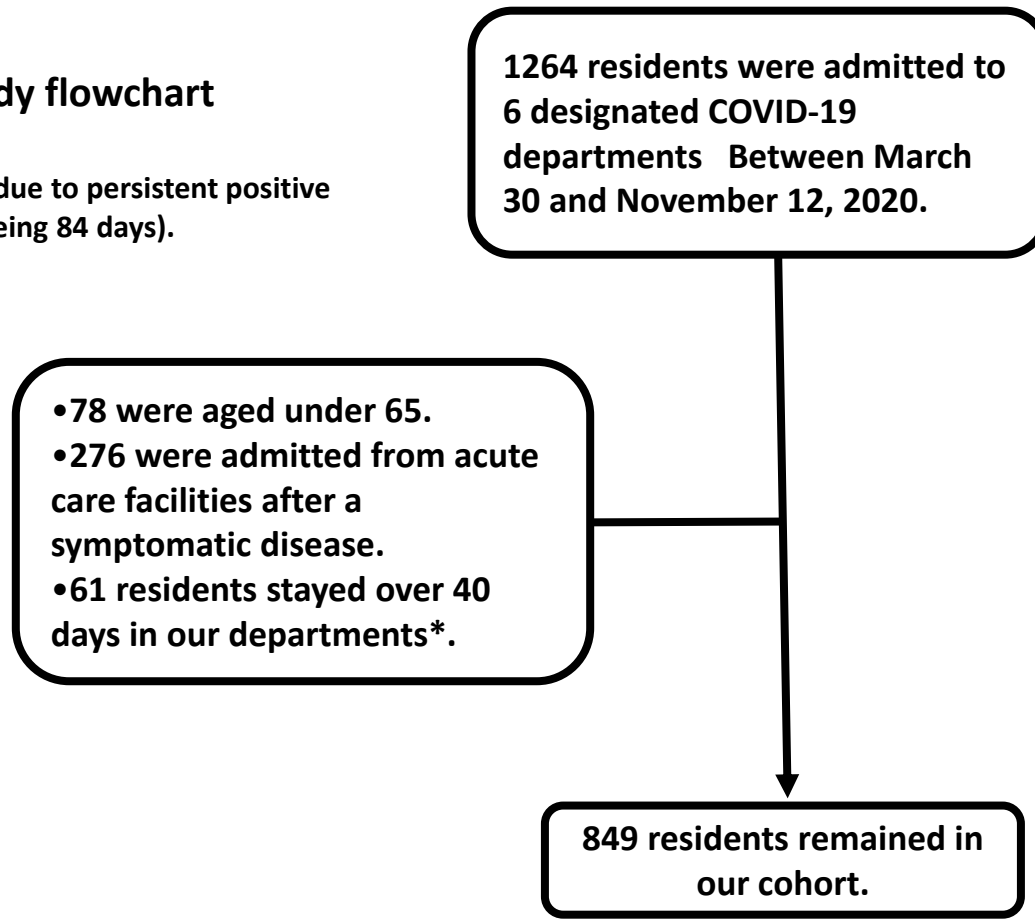
Statistical Analysis

- Primary outcome was assessed using Kaplan-Meier survival analysis and tested for statistical significance using the log-rank test.
- We entered variables with a p value ≤ 0.15 and clinical plausibility into a multivariate analysis using the Cox proportional hazard model to identify independent risk factors for 40-day hospitalization or mortality.

Results

Figure 1: Study flowchart

* Most of which due to persistent positive swabs (longest being 84 days).



Results

Residents' characteristics

All included residents	N=849 (100%)
Age (median, IQR)*	84 (78-90)
Gender , male	292 (34.4)
Arrived from	
Home	23 (2.7)
Long term care facility	765 (90.1)
Rehabilitation	61 (7.2)
KATZ index (median, 25%-75%)	1.09 (0-1)

Results

Comorbidities	
Charlson comorbidity index ** (median, 25%-75%)	6 (5-7)
Dementia	700 (82.4)
Pressure ulcer	102 (12.0)
Diabetes mellitus	318 (37.5)
Hypertension	610 (71.8)
COPD	97 (11.4)
Cerebrovascular disease	217 (25.6)
Ischemic heart disease	188 (22.1)
Congestive heart failure	115 (13.5)
Obesity	67 (7.9)
Hyperlipidemia	348 (41.0)

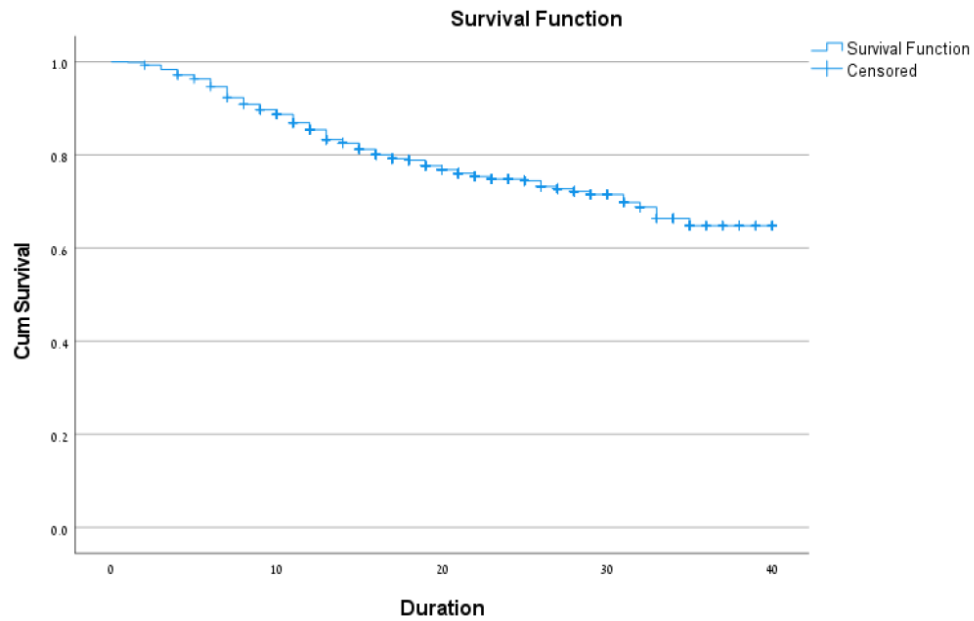
Chronic medications	
Vitamin D	208 (24.5)
Anticonvulsants	58 (6.8)
Benzodiazepines	415 (48.9)
Beta blockers	309 (36.4)
Narcotics	62 (7.3)
ACE inhibitors	169 (19.9)
Diuretics	216 (25.4)
Aspirin	159 (18.7)
Prophylactic anticoagulants	65 (7.7)

Results

- 75.5% residents were discharged after considered cured from COVID-19, 14.7% were hospitalized, and 9.7% died in our facilities.
- Survival analysis showed that 35% of residents reached the composite outcome of death or hospitalization by day 40.
- 33.8% had Fever $> 38^{\circ}\text{C}$ and 47% of them were hospitalized or died.
- 36% residents had $\text{SpO}_2 < 92\%$ during the observation period, and 34% of them reached the primary outcome.
- 57% developed symptoms during their stay.

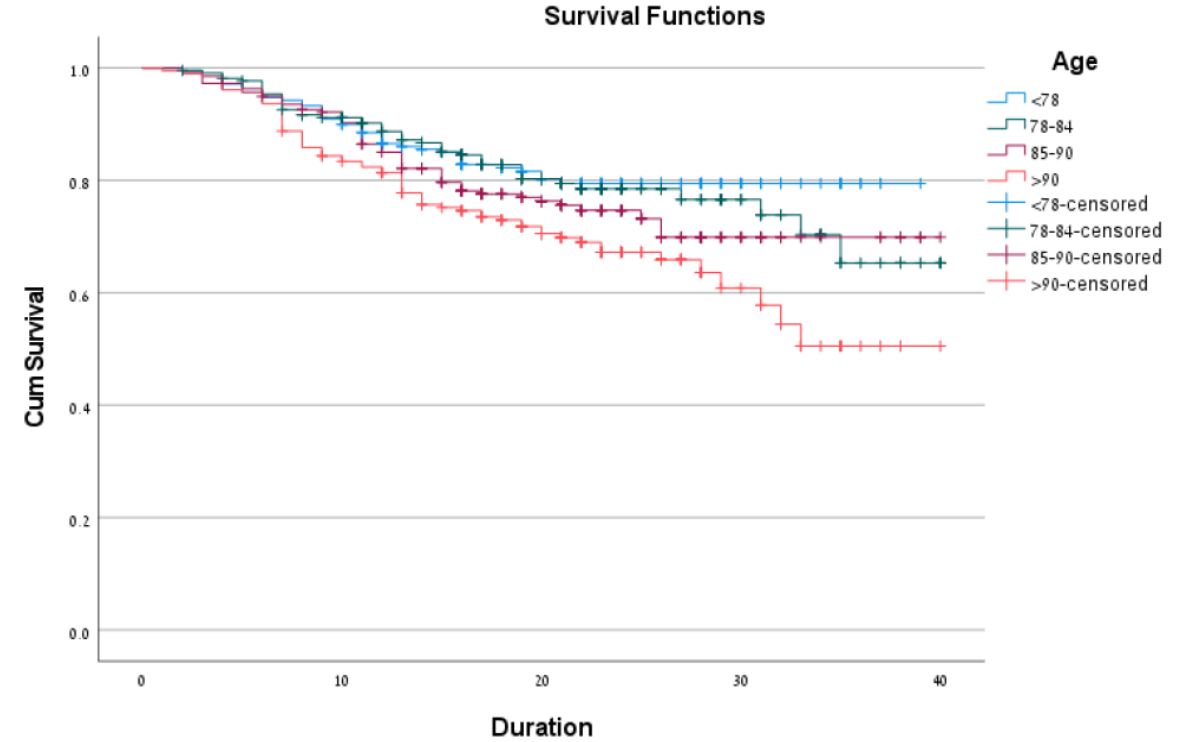
Results

Kaplan–Meier curves for severe symptomatic disease-free survival



Number at risk

	Admission	Day 10	Day 20	Day 30	Day 40
	849	745	470	93	5



Number at risk

	Admission	Day 10	Day 20	Day 30	Day 40
<78	209	189	119	20	0
78-84	218	190	116	29	3
85-90	217	194	117	21	0
>90	205	169	115	20	0

Results

Multivariate Cox regression analysis of risk factors for severe symptomatic disease

N=849

-2 log likelihood= 2610.899,
Chi-square =47.189, df=12,
P<0.001

Variable	Hazard ratio (95% CI)	P value
Age*	1.23 (1.10-1.40)	0.001
Gender, male	1.41 (1.10-1.88)	0.02
Charlson comorbidity index**	1.00 (0.94-1.11)	0.602
Hypertension	1.23 (0.88-1.72)	0.224
COPD	1.81 (1.23-2.67)	0.003
PVD	1.30 (0.91-1.86)	0.154
Obesity	0.60 (0.32-1.10)	0.099
Hyperlipidemia	1.32 (1.00-1.75)	0.051
Vitamin D	0.70 (0.49-1.00)	0.051
Anticonvulsants	0.61 (0.31-1.20)	0.155
Aspirin	0.74 (0.49-1.10)	0.133
Prophylactic anticoagulants	0.59 (0.31-1.11)	0.103

Abbreviations: CI - Confidence Interval; COPD-Chronic Obstructive Pulmonary Disease; PVD - Peripheral Vascular Disease

*Age-per one year increment

** Charlson comorbidity index – per one grade increment

Discussion

- Outcomes are in concordance with previous published data
- Age remained a significant risk factor, Male sex and COPD were also significant risk factors in the multivariate analysis.
- Hypertension, diabetes, cardiovascular disease, and kidney disease have not reached statistical significance. This probably is a result of the high comorbidity burden.
- The trend for significance in obesity and vitamin D were probably a result of less sarcopenic and better managed patients.

Discussion

Speculated advantages

- Better source control in the nursing homes
- Less social isolation
- More available staff members
- More experienced staff with PPE and covid management

Limitation

- Limited follow-up periods
- Delirium and BPSD were not assessed
- Important outcomes to the older adult population, such as weight loss, delirium, depression, and functional decline were not assessed
- No long covid symptoms and out comes

Conclusion

- **Age remains a predominant risk factor.**
- **Covid units in skilled nursing homes offer several possible advantages with comparable outcomes to those described previously.**
- **More studies are needed to assess potential advantages of the designated units regarding major geriatric outcomes such as delirium, weight loss, depression, functional decline, and cognitive impairment.**

Levy Y, Turjeman A, Cooper L, et al. Frail Older Adults with Presymptomatic SARS-CoV-2 Infection: Clinical Course and Prognosis [published online ahead of print, 2022 Jan 31]. *Gerontology*. 2022;1-9. doi:10.1159/000521412

I am ready
for
Questions

