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# Long COVID in a prospective cohort of home-isolated patients

Bjørn Blomberg<sup>1,2,3</sup>, Kristin Greve-Isdahl Mohn<sup>3,4</sup>, Karl Albert Brokstad<sup>5,6</sup>, Fan Zhou<sup>4</sup>, Dagrun Waag Linchhausen<sup>7</sup>, Bent-Are Hansen<sup>8</sup>, Sarah Lartey<sup>4</sup>, Therese Bredholt Onyango<sup>4</sup>, Kanika Kuwelker<sup>1,2,3,4</sup>, Marianne Sævik<sup>3</sup>, Hauke Bartsch<sup>9,10</sup>, Camilla Tøndel<sup>11,12</sup>, Bård Reiakvam Kittang<sup>1,8</sup>, Bergen COVID-19 Research Group\*, Rebecca Jane Cox<sup>4,13,14</sup> and Nina Langeland<sup>1,2,3,14</sup>

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Norway  
Bergen  
調査結果

**Table 1 | Characteristics of study population available for follow-up at 6 months**

	Seronegative exposed controls	All patients with COVID-19	Hospitalized COVID-19	Home-isolated COVID-19
	% (n)	% (n)	% (n)	% (n)
	N = 60	N = 312	N = 65	N = 247
Female sex	63% (38)	51% (160)	46% (30)	53% (130)
Age, median (IQR)	29 (14–48)	46 (30–58)	55 (45–68)	43 (27–55)
Age categories				
0–15 years	28% (17)	5% (16)	0% (0)	6% (16)
16–30 years	23% (14)	21% (65)	6% (4)	25% (61)
31–45 years	22% (13)	22% (69)	17% (11)	23% (58)
46–60 years	25% (15)	29% (90)	35% (23)	27% (67)
>60 years	2% (1)	23% (72)	42% (27)	18% (45)
BMI, median (IQR)	23.3 (20.9–25.6)	24.6 (22.8–27.3)	27.0 (24.1–29.9)	24.3 (22.5–26.5)
Any comorbidity <sup>a</sup>	15% (9)	44% (137)	69% (45)	37% (92)
Asthma, COPD <sup>b</sup>	2% (1)	12% (38)	22% (14)	10% (24)
Hypertension	0% (0)	11% (35)	25% (16)	8% (19)
Chronic heart disease	0% (0)	7% (22)	18% (12)	4% (10)
Rheumatic disease	2% (1)	6% (20)	12% (8)	5% (12)
Diabetes mellitus	3% (2)	4% (13)	9% (6)	3% (7)
Immunosuppression	0% (0)	4% (11)	8% (5)	2% (6)
Current or prior smoker <sup>c</sup>	19% (11/57)	31% (96/310)	39% (25/64)	29% (71/246)
Severity of disease <sup>d</sup>				
Asymptomatic (1)	53% (30/57) <sup>e</sup>	2% (5/312)	-	2% (5/247)
Home-isolated with symptoms (2)	47% (27/57) <sup>e</sup>	78% (242/312)	-	98% (242/247)
Hospitalized without medical needs (3)	-	-	-	-
Hospitalized with medical needs (4)	-	10% (31/312)	48% (31/65)	-
Hospitalized needing O <sub>2</sub> (5)	-	8% (24/312)	37% (24/65)	-
Hospitalized needing NIV (6)	-	1% (4/312)	6% (4/65)	-
Hospitalized needing respirator (7)	-	2% (6/312)	9% (6/65)	-
Dead (8)	-	-	-	-



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**Table 2 | Long-term complications by age group in 247 home-isolated patients with COVID-19 at 6-month follow-up**

Characteristic	All	0-15 years	16-30 years	31-45 years	46-60 years	Over 60 years
	% (n/N)	% (n)	% (n)	% (n)	% (n)	% (n)
	N = 247	N = 16	N = 61	N = 58	N = 67	N = 45
Age, median (IQR)	43 (27-55)	8 (6-12)	24(22-27)	37 (34-41)	53 (49-55)	67 (63-73)
Female gender	53% (131/247)	56% (9)	54% (33)	52% (30)	52% (35)	53% (24)
Status at 6 months						
Any symptoms	55% (136/247)	13% (2)*	52% (32)	59% (34)	61% (41)	60% (27)
Fever	2% (4/247)	0% (0)	0% (0)	5% (3)	1% (1)	0% (0)
Cough	6% (15/247)	0% (0)	0% (0)	9% (5)	4% (3)	16% (7)
Dyspnea	15% (38/247)	0% (0)	13% (8)	17% (10)	18% (12)	18% (8)
Palpitations	6% (15/247)	0% (0)	3% (2)	7% (4)	9% (6)	7% (3)
Stomach upset	6% (15/247)	6% (1)	5% (3)	7% (4)	6% (4)	7% (3)
Disturbed taste/smell	27% (67/247)	13% (2)	28% (17)	34% (20)	28% (19)	20% (9)
Fatigue	30% (69/231)	- <sup>a</sup>	21% (13)	31% (18)	33% (22)	36% (16)
Concentration problems	19% (44/231)	- <sup>a</sup>	13% (8)	19% (11)	21% (14)	24% (11)
Memory problems	18% (42/231)	- <sup>a</sup>	11% (7)	16% (9)	22% (15)	24% (11)
Sleep problems	5% (13/247)	0% (0)	5% (3)	7% (4)	4% (3)	7% (3)
Headache	11% (28/247)	0% (0)	11% (7)	14% (8)	9% (6)	16% (7)
Dizziness	10% (24/247)	0% (0)	7% (4)	10% (6)	10% (7)	16% (7)
Tingling in fingers	4% (9/247)	0% (0)	0% (0)	2% (1)	4% (3)	11% (5)

\*Statistically significant difference at level  $P < 0.05$  in univariable analysis using binomial logistic regression with age group 46-60 as reference group. <sup>a</sup>Children younger than 16 years were not assessed for these symptoms; therefore,  $N = 231$  for these categories.

R3年度 第4回 採血事業浜口班班会議資料

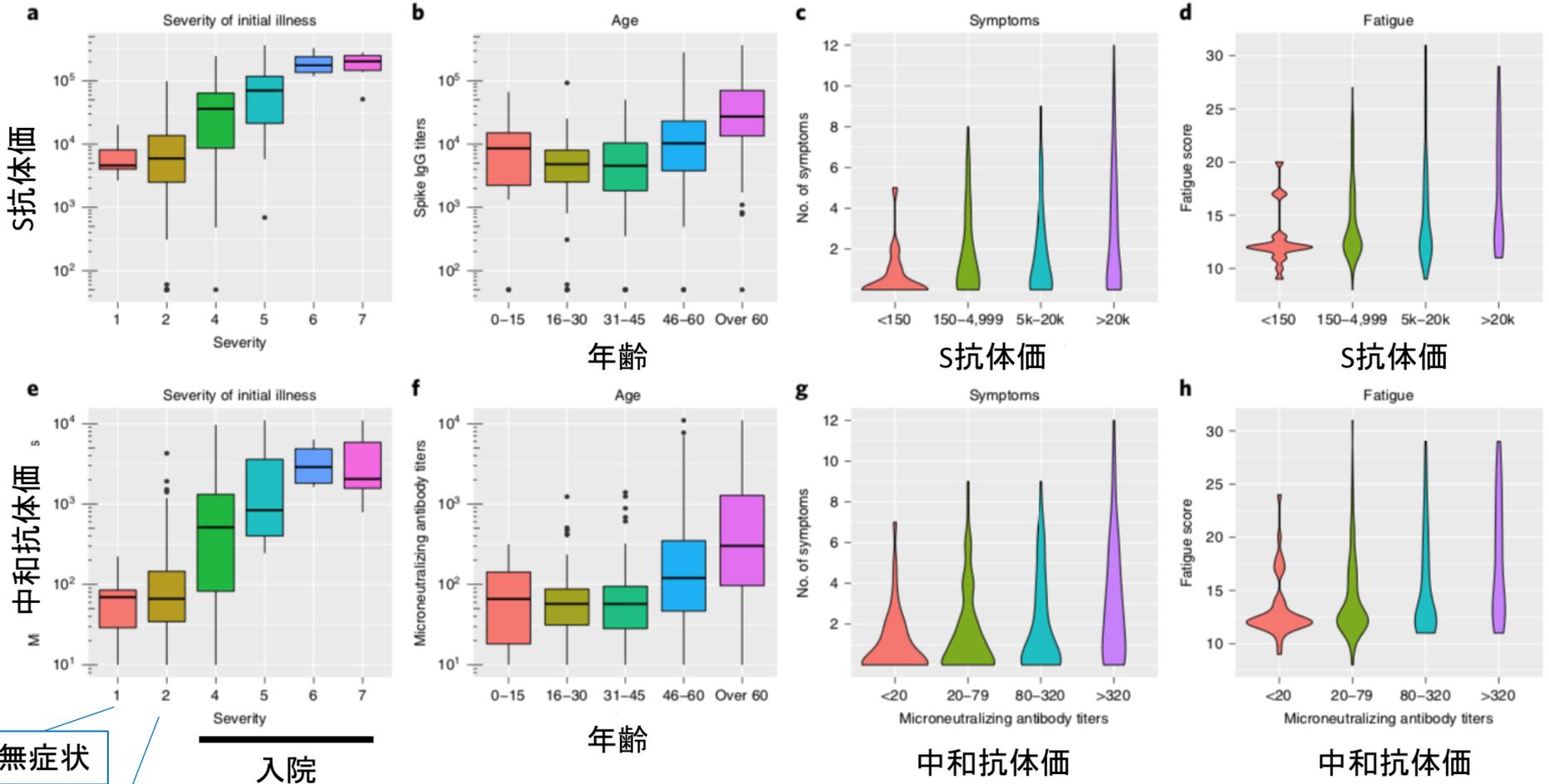
感染6ヶ月後で自宅療養者・軽症者でも52%が後遺症あり。若齢世代16-30歳でも決して少なくない

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無症状

入院

O<sub>2</sub> respi  
治療 venti

自宅  
待機

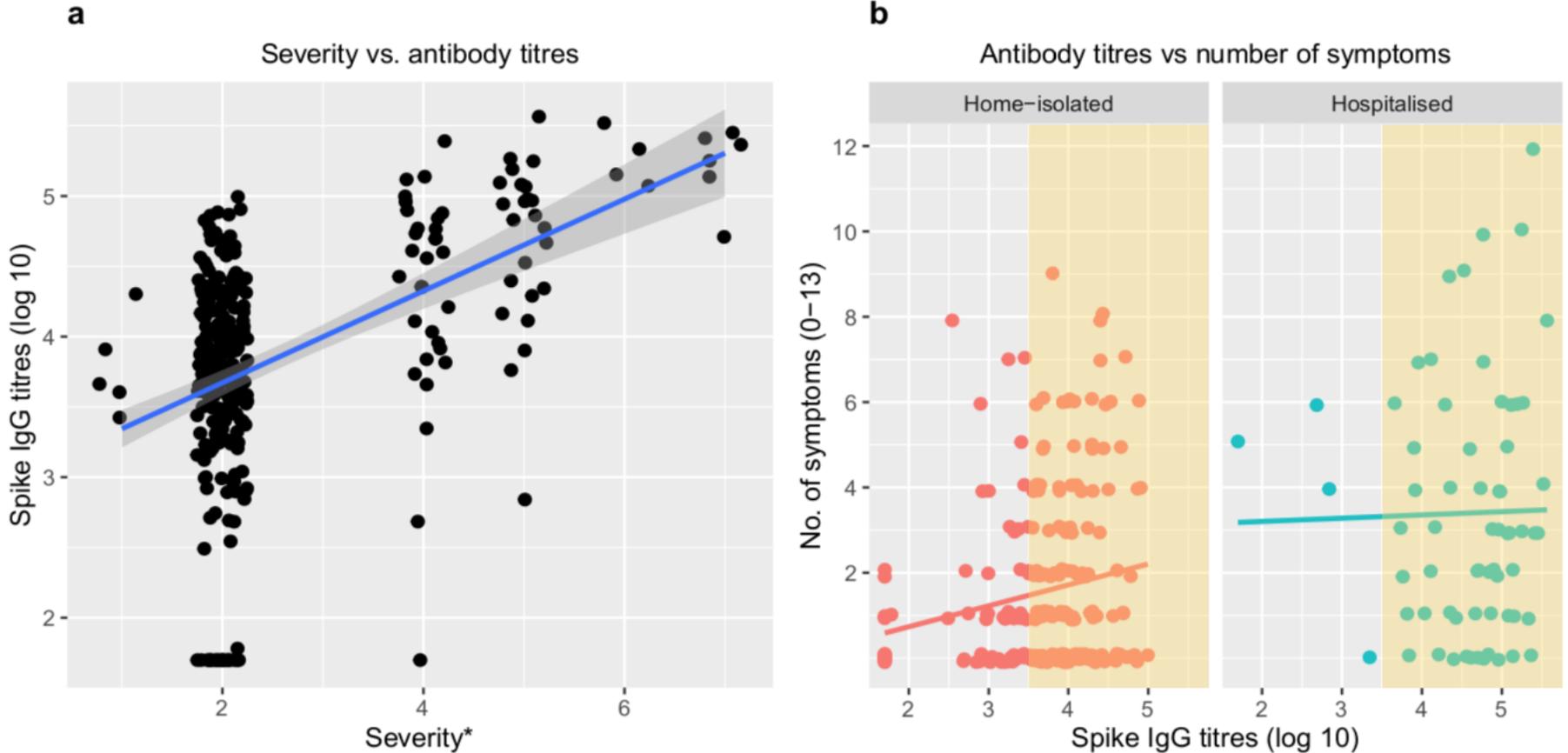
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## 抗体価と重症度の関係





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## 後遺症に関するリスク因子解析

**Table 4 | COVID-19 patient factors associated with increasing number of symptoms and higher fatigue score at 6-month follow-up—negative binomial regression analysis**

	Number of symptoms (0–13) <sup>a</sup>				Fatigue score (0–33) <sup>b</sup>			
	<i>n</i> (%)	RR (CI) <i>P</i> <sup>c</sup>	aRR (CI) <i>P</i> <sup>d</sup>	<i>n</i> (%) <sup>b</sup>	RR (CI) <i>P</i> <sup>c</sup>	aRR (CI) <i>P</i> <sup>d</sup>		
	<b><i>N</i> = 312</b>				<b><i>N</i> = 293</b>			
Female sex	160 (51%)	1.28 (0.95–1.73) 0.101	1.35 (1.01–1.81) <b>0.040</b>	149 (51%)	1.09 (1.01–1.16) <b>0.018</b>	1.09 (1.02–1.16) <b>0.014</b>		
Older age (by 10-year intervals)		1.18 (1.06–1.28) <b>&lt;0.001</b>	1.08 (0.98–1.19) 0.092		1.03 (1.01–1.05) <b>0.002</b>	1.00 (0.98–1.02) 0.924		
BMI		1.04 (1.01–1.08) <b>0.016</b>	1.00 (0.97–1.04) 0.876		1.01 (1.00–1.02) <b>0.048</b>	1.00 (0.99–1.01) 0.715		
Comorbidity								
Asthma/COPD	38 (12%)	2.00 (1.33–3.07) <b>0.001</b>	1.57 (1.05–2.37) <b>0.031</b>	37 (13%)	1.22 (1.11–1.34) <b>&lt;0.001</b>	1.14 (1.03–1.25) <b>0.008</b>		
Hypertension	35 (11%)	1.44 (0.93–2.30) 0.114		34 (12%)	1.13 (1.02–1.26) <b>0.017</b>	1.01 (0.90–1.13) 0.902		
Chronic heart disease	22 (7%)	1.70 (1.01–3.02) 0.057	1.23 (0.71–2.18) 0.460	21 (7%)	1.20 (1.06–1.35) <b>0.005</b>	1.08 (0.94–1.23) 0.295		
Rheumatic disease	20 (6%)	1.35 (0.77–2.50) 0.321		20 (7%)	1.15 (1.01–1.30) <b>0.038</b>	1.05 (0.92–1.18) 0.460		
Diabetes	13 (4%)	1.33 (0.67–2.87) 0.438		13 (4%)	1.14 (0.97–1.34) 0.098	1.06 (0.91–1.23) 0.445		
Immunosuppression	11 (4%)	1.18 (0.56–2.76) 0.679		10 (3%)	1.12 (0.93–1.34) 0.232			
Current or prior smoker	96 (31%)	1.18 (0.86–1.63) 0.305		95 (32%)	1.05 (0.97–1.12) 0.230			
Severity of initial illness		1.28 (1.14–1.44) <b>&lt;0.001</b>	1.17 (1.00–1.37) 0.062		1.08 (1.05–1.10) <b>&lt;0.001</b>	1.06 (1.02–1.10) <b>0.004</b>		
Days in hospital		1.02 (1.00–1.05) 1.016	0.99 (0.97–1.02) 0.525		1.01 (1.00–1.01) <b>0.002</b>	1.00 (0.99–1.00) 0.464		
Spike IgG titer at 2 months <sup>e</sup>		1.51 (1.26–1.81) <b>&lt;0.001</b>	1.25 (1.01–1.56) <b>0.037</b>		1.11 (1.07–1.16) <b>&lt;0.001</b>	1.07 (1.02–1.12) <b>0.009</b>		
Microneutralizing antibody titer at 2 months <sup>e</sup>		1.52 (1.25–1.86) <b>&lt;0.001</b>	<sup>-f</sup>		1.13 (1.08–1.19) <b>&lt;0.001</b>	<sup>-f</sup>		

Analysis of associated factors was done by negative binomial regression. aRR, adjusted rate ratio; RR, rate ratio. Statistical significance at the level of  $P < 0.05$  is shown in bold text. <sup>a</sup>Patients were assessed for 13 symptoms mentioned in Table 2. <sup>b</sup>Chalder fatigue score is validated only for patients aged  $\geq 16$  years ( $n = 293$ ); possible fatigue scores range from 0 (no fatigue) to 33 (worst possible fatigue). <sup>c</sup>Neurological illness ( $n = 8$ ) and malignancy ( $n = 5$ ) were not significantly associated with the outcomes and were not included in the table. <sup>d</sup>Factors with statistical significance of  $< 0.1$  were included in the multivariable analysis. <sup>e</sup>SARS-CoV-2 spike protein antibody titers,  $\log_{10}$  transformed. <sup>f</sup>Microneutralizing antibody titers were omitted owing to collinearity with spike IgG antibody titers.