

# Low BMI and malnutrition, but not obesity, are risk factors for older adults dying from COVID-19

21 September 2021

Variable	n	COVID-19			Non-COVID-19				
		n	Odds ratio	p	n	Odds ratio	p		
Age	1409		1.13 (1.10, 1.17)	<0.001	8622		1.13 (1.09, 1.18)	<0.001	
Sex	765		Reference		5247		Reference		
	Men	844	2.46 (1.99, 3.04)	<0.001	3375	1.47 (0.98, 2.45)	0.14		
Number of diseases	1409		0.97 (0.86, 1.08)	0.551	8622		1.02 (0.84, 1.24)	0.82	
CCI	1409		1.25 (1.05, 1.45)	0.004	8622		1.37 (1.16, 1.58)	<0.001	
HFRS	1409		1.22 (1.02, 1.46)	0.027	8622		1.17 (1.02, 1.34)	0.02	
Number of drugs	1409		1.05 (1.01, 1.10)	0.016	8622		1.06 (1.01, 1.11)	0.02	
Wave	846		Reference		5484		Reference		
	1st	563		0.97 (0.63, 1.48)	0.897	3138		0.67 (0.37, 1.15)	0.16
BMI	709		Reference		4408		Reference		
	Normal weight, 18.5<BMI<25.0	112		2.30 (1.17, 4.31)	0.012	847		0.84 (0.31, 1.88)	0.70
	Underweight, BMI<18.5	384		1.05 (0.63, 1.70)	0.861	2228		0.69 (0.33, 1.25)	0.21
	Obese, BMI>30.0	184		1.23 (0.57, 2.45)	0.578	1139		0.67 (0.25, 1.52)	0.38

death was almost doubled for patients classified as frail according to the Clinical Frailty Scale (CFS) as compared to non-frail older patients. In these patients, [acute kidney injury](#) and multimorbidity were also strong [risk factors](#) for death.

## BMI and nutritional status as risk factors?

The role of body composition and nutritional status in COVID-19 pathology has not been characterized well in hospitalized [older adults](#) (>65 years). Therefore, in our study, we analyzed the associations of body mass index, and nutritional status assessed using Mini Nutritional Assessment-Short Form (MNA-SF) with in-geriatric [hospital mortality](#) in older patients treated for COVID-19. As a reference, the analyses were performed also in older patients who were hospitalized for other causes than COVID-19 in the same geriatric hospitals during the same time period. Data in the analysis comprised medical records of ~10 000 patients in Stockholm during the first two pandemic waves. Age range of the patients was from 65 to 105 years, and their median age was 83 years. Follow-up of survival was short, i.e., only the hospitalization period.

The major finding of this study was that indicators of undernutrition; i.e., underweight (BMI

Figure 1. The fully adjusted mortality risk model for the BMI analysis in geriatric patients hospitalized for COVID-19 (n = 1409, 112 died) and other causes (n = 8622, 67 died). Abbreviations: BMI = body mass index, CCI = Charlson comorbidity index, HFRS = Hospital Frailty Risk Score. Credit: DOI: 10.1016/j.clnu.2021.07.025

A recent study published in *Clinical Nutrition* shows that low BMI and malnutrition are risk factors for in-hospital mortality in geriatric COVID-19 patients. The study was performed at Karolinska Institutet in collaboration with Theme Inflammation & Aging at Karolinska University Hospital and geriatric clinics in the Stockholm Region.

These results are important as information on the groups with the highest mortality, i.e. the very old and [frail patients](#), is underrepresented. For example, obesity is a risk factor in COVID-19 infection in younger adults but we instead found that low BMI and malnutrition increased the risk of in-hospital mortality in geriatric COVID-19 patients who were mostly older than 75 years, says Ph.D. Laura Kananen, a researcher at the Department of medical epidemiology and biostatistics, KI.

## COVID-19 in hospitalized geriatric patients

During the first COVID-19 wave in the spring 2020 in Sweden, researchers at Karolinska Institutet reported that in-hospital mortality was 24% among older hospitalized geriatric patients. The risk of

APA citation: Low BMI and malnutrition, but not obesity, are risk factors for older adults dying from COVID-19 (2021, September 21) retrieved 22 October 2022 from <https://medicalxpress.com/news/2021-09-bmi-malnutrition-obesity-factors-older.html>

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