

Risk Groups and Mortality in Patients with SARS-CoV-2 from Family Medicine Unit No. 43 in Southeastern Mexico

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Abstract

SARS-CoV-2 infection is a viral disease that causes respiratory infections that can cause multiple complications. Patients with adjacent morbidities have a higher chance of complications and mortality. The National Health and Nutrition Survey (ENSANUT) in 2018 reported that in Mexico, 75.2% of adults aged 20 years and over are overweight and obese, both situations are closely related to the cases reported as severe COVID and even with a higher risk of mortality. The main objective was to evaluate the risk and mortality groups in patients with SARS-CoV-2 from family medicine in the south of México. The study was carried out during the 2020 year, in the Family Medicine Unit No. 43 of Villahermosa, Tabasco, a cross-sectional, retrospective investigation was carried out with an analytical approach, and the sample was obtained using the formula of n for infinite populations that correspond to 215, patients were included who met the selection criteria; 3 groups were integrated: DM2, HAS and obesity. Descriptive statistics and χ^2 formula were used, using the SPSS version 25 Windows program. The female gender presented the highest number of infections 122 (56.7%) and mortality: 5 (2.32%), obesity comorbidity presented the highest number of infections: 194 (90.2%), HAS: 153 (71.2%), and MD: 44 (20.46%). Complications were observed in 23 (10.69%), distributed in: SIRA: 7 (3.3%), multiple organ failure: 6 (2.8%), heart failure: 6 (2.8%) and pneumonia 4 (1.9%). The observed mortality was 8 (3.72%). The comorbidities of patients with the highest mortality were: SAH: 6 (75%) ($\chi^2 = 9.169$; $df = 1$; $p = 0.010$) and obesity: 6 (75%) ($\chi^2 = 9.169$; $df = 1$; $p = 0.010$). The group with the highest risk for SARS-CoV-2 was patients with overweight/obesity comorbidities. Mortality was 3.7%. The patients who died had at least one or

more comorbidities. The main complications were ARIS, heart failure, and multiple organ failure.

Keywords

Pandemic, COVID-19, SARS-CoV-2, Hypertension, Diabetes, Obesity, Mortality

1. Introduction

The pandemic caused by the coronavirus has caused respiratory symptoms and various complications [1]. It can develop difficult-to-manage pneumonia, multiple organ failure, Acute Myocardial Infarction (AMI), and Severe Acute Respiratory Syndrome (SARS) [2] that entail a high risk of mortality [3]. More than 636 million confirmed cases and more than 6.61 million deaths are estimated, for which hygienic-sanitary protection measures [4] and the implementation of vaccines were established to control the number of contagions [5].

The 2018 National Health and Nutrition Survey (ENSANUT) reported that in Mexico, 75.2% of adults aged 20 and over are overweight and obese, of which 76.8% are women [6]. Obesity in women is related to an increased risk of cardiovascular diseases, diabetes, hypertension, gynecological disorders [7], and infectious diseases [8].

Studies have shown that female patients infected with SARS-CoV-2 are older than 60 years (range, 22 - 92 years) and 75 years (54.3%) for males [9]. SARS-CoV-2 positive patients hospitalized; they present the following complications: acute respiratory distress syndrome (ARDS): 44.6%, heart failure: 28.8%, and multiple organ failure: 14.1%. The comorbidities found in the patients were: hypertension (43, 31.2%) and diabetes (14, 10.1%) [10].

Yang *et al.*, in Wuhan, China, carried out an observational design in 2020, where they analyzed the complications due to SARS-CoV-2 in 52 critically ill patients: 21 (40%) presented comorbidities, even those who died in a hospital. period of 28 days (40%) [11].

In the South American population, the presence of comorbidities was determined in people positive for SARS-CoV-2, such as: cardiovascular diseases: 10.5% diabetes: 7.3%, chronic respiratory diseases: 6.3%, hypertension: 6.0%, and cancer 5.6% [12].

Petrova *et al.* (2020) conducted a study in Spain where they observed that people with severe obesity have a higher risk of hospitalization, intensive care, mechanical ventilation, and/or death, mortality from COVID-19 was 76% higher than in non-obese people [13].

Comorbidities associated with COVID-19 disease and the most affected age ranges have been described; however, the relationship between risk groups and mortality in patients with SARS-CoV-2 in a unit of interest is of interest in fam-

ily medicine in Mexico.

2. Objective

Assess risk groups and mortality in patients with SARS-CoV-2 from a Family Medicine Unit in México.

3. Material and Method

3.1. Methodological Design

During 2020, a cross-sectional, retrospective, and analytical non-intervention investigation was carried out.

3.2. Universe and Sample

The sample was calculated using the n formula for infinite populations, corresponding to 215 subjects who met the selection criteria. Three groups were integrated by simple randomization: Diabetes Mellitus, systemic arterial hypertension, and obesity. Other pathologies prior to infection were considered: heart disease, respiratory diseases, or conditions such as asthma, acute rhinitis, neurological diseases such as Parkinson's, Alzheimer's, stroke, multiple sclerosis, epilepsy, hypothyroidism, hyperthyroidism, and CKD. The most relevant complications were analyzed. Descriptive statistics were used, and the contrast of the variables was performed using the χ^2 formula. The information was processed using the SPSS version 25 Windows program.

Inclusion criteria

- ✓ Patients with a molecular diagnosis of COVID-19.
- ✓ Patients admitted to the respiratory disease's unit of the Family Medical Unit of the Mexican Institute of Social Security No. 43.
- ✓ Patients entitled to the Mexican Institute of Social Security.
- ✓ Patients with comorbidities prior to admission.
- ✓ Both sexes were included.

Exclusion criteria

- ✓ Patients with a serological diagnosis of COVID-19.
- ✓ Asymptomatic patients with COVID-19 disease.
- ✓ Patients who were not hospitalized.
- ✓ Patients who did not sign the informed consent.

3.3. Ethical Considerations

In accordance with the regulations of the General Health Law in Mexico regarding research in Article 17, the project is classified as low risk and was carried out in accordance with the provisions of the Declaration of Helsinki.

The present study was submitted for evaluation and subsequent approval by the research ethics committee of the Mexican Institute of Social Security and the research committee of the Academic Division of Health Sciences with registration number UJAT-DACS-MF-22-01.

4. Results

The sociodemographic characteristics of the sample reported the following results: mean: 39, median: 37, mode: 37, the gender variable was distributed by absolute numbers and proportions as follows: male 93 (43.3%) and female 122 (56.7%), with an average age of 54 years for women and 58 years for men. The most frequently reported marital status was married with 63% of the sample, common-law union with 18%, divorced with 10% and single with 9%.

The female gender being the most contagious, the group of patients with obesity reported: overweight: 75 (34.9%), Grade I obesity: 52 (24.2%), Grade II obesity 48 (22.3%), Grade III obesity: 19 (8.8%), without obesity: 21 (9.8%); the analysis of the hypertension variable presented the following results: arterial hypertension in 62 (28.8%), without hypertensive disease 153 (71.2%). When performing statistical analysis of the diabetes group, the following results were found Type 1 diabetes mellitus: 8 (3.7%), Type 2 diabetes mellitus: 36 (16.7%), non-diabetics: 171 (79.5%).

The analysis of the obesity variable in contrast to the complications obtained the following results: obesity/acute respiratory distress syndrome: $\chi^2 = 6.823$, $df = 1$, $p = 0.033$; obesity/death: $\chi^2 = 9.169$, $df = 1$, $p = 0.010$, the rest of the variables did not present statistical significance. The analysis of the group with and without arterial hypertension contrasted with acute respiratory distress syndrome reported: $\chi^2 = 6.823$, $df = 1$, $p = 0.033$. Arterial hypertension/death: $\chi^2 = 9.169$, $df = 1$, $p = 0.010$. Arterial hypertension/pneumonia: $\chi^2 = 4.497$, $df = 1$, $p = 0.106$, the rest of the variables did not present statistical significance. The contrast of the Diabetes mellitus variable with the complications obtained the following results: Diabetes mellitus/pneumonia: $\chi^2 = 5.653$, $df = 1$, $p = 0.059$. Diabetes/multiorgan failure: $\chi^2 = 4.471$, $df = 1$, $p = 0.107$. Diabetes mellitus/heart failure: ($\chi^2 = 4.471$); $df = 1$; $p = 0.107$. Diabetes mellitus/AIDS: $\chi^2 = 3.231$, $df = 1$, $p = 0.199$. Diabetes mellitus/death: $\chi^2 = 4.770$, $df = 1$, $p = 0.092$.

In the mortality variable, it was found deaths: 8 (3.7%), recovered: 207 (96.3%). The contrast of mortality and comorbidities was found mortality/age: $\chi^2 = 88.691$, $df = 1$, $p = 0.001$. The contrast of sex/death: male sex: 3 (1.39), survivors of SARS-CoV-2: 90 (41.86%); female sex: death from SARS-CoV-2: 5 (2.32%), survivors of SARS-CoV-2: 117 (54.41%). Obesity/death: $\chi^2 = 6.897$, $df = 1$, $p = 0.142$. Hypertension/death: $\chi^2 = 9.169$, $df = 1$, $p = 0.010$. When contrasting the mortality and diabetes mellitus variables, I report the following: $\chi^2 = 4.770$, $df = 1$, $p = 0.092$ (**Table 1**).

The contrast of comorbidities: respiratory disease, liver disease, neurological disease, endocrine disease, and kidney disease in relation to the complications and the complications considered in the following project did not report statistical significance with the analysis performed.

5. Discussion

It is important to point out that one of the limitations that arose during the de-

velopment of the study was the lack of confirmatory tests by PCR of the admitted patients, as well as the ignorance on the part of the patients of comorbidities prior to their admission to the hospital, since during the intervention indicated that they did not suffer from comorbidities and the diagnosis was made during their hospital stay, as well as the ignorance of the years of evolution and control of the comorbidities that would be an important point to analyze in future investigations.

The evaluation of the results obtained in this study with respect to the age variable found that the population with the highest number of infections occurred in the range of 35 - 39 (22.8%); in contrast to the results of the study carried out by Li *et al.*, who determined that the age of greatest contagion were patients older than 60 years (range, 22 - 92 years) and 75 years (54.3%).

The female gender presented a higher percentage of cases: 122 (56.7%), in contrast to the results of Li *et al.* who determined that the male sex represented the group with the highest contagion.

The patients in the research carried out in the present study reported at least one or more comorbidities: obesity 194 (90.23%), arterial hypertension 62 (28.8%), diabetes mellitus 44 (20.46%). Coinciding with the results obtained by Yang *et al.*, where they observed that 21 (40%) of the patients presented comorbidities.

Table 1. Cross tabulation of the death variables with the comorbidity variables.

Comorbidity	n = 215	%	Pneumonia			Multiple Organ Failure			Heart Failure			Acute Respiratory Distress Syndrome			Dead		
			T	χ^2	P	T	χ^2	P	T	χ^2	P	T	χ^2	P	T	χ^2	P
SAH																	
With SAH	62	28.8	1		0.106	2			2		0.09	2			6		
Without SAH	153	71.2	3	4.497		4	4.621	0.099	4	4.621	9	5	6.823	0.033	2	9.169	0.010
DIABETES																	
DM1	8	3.7	1			1			1		1				1		
DM2	36	16.7	0			2			2	0.10	2				3		
Without Diabetes	171	79.5	3	5.653	0.059	3	4.471	0.107	3	4.471	7	4	3.231	0.199	4	4.770	0.092
OBESITY																	
Overweight	75	34.9	3			5			4		5				5		
Grade I	52	24.2	0			0			0		0				0		
Grade II	48	22.3	0			1			1	0.37	1				1		
Grade III	19	8.8	0	5.104	0.277	0	6.883	0.142	0	4.215	8	0	6.823	0.033	0	9.169	0.010
Without Obesity	21	9.8	1			0			1		1				2		

Note: Chi-square. SAH: Systemic Arterial Hypertension. Source: database risk groups and mortality in patients with SARS-CoV-2 from Family Medicine Unit Number 43 in Villahermosa, Tabasco.

Complications occurred in 23 (10.69%); distributed as follows: patients with: AIDS: 7 (3.3%), multiple organ failure: 6 (2.8%), heart failure: 6 (2.8%), and pneumonia 4 (1.9%). results like those obtained by Wang *et al.*: SIRA: 44.6%, heart failure: 28.8%, and multiple organ failure: 14.1%.

Mortality was 8 (3.7%) in those patients with at least one comorbidity, being the patients with SAH: 6 (75%) ($\chi^2 = 9.169$; $df = 1$; $p = 0.010$) and obesity: 6 (75%) ($\chi^2 = 9.169$; $df = 1$; $p = 0.010$), coinciding with Petrova *et al.* who determined a 76% mortality from SARS-CoV-2 in patients with obesity.

6. Conclusions

The age range of 35 - 39 (22.8%) presented the highest number of infections by SARS-CoV-2, it is noteworthy that the female gender included in the research presented the highest number of infections with 122 patients (56.7%). In the education variable, 36.7% of the patients had a bachelor's level of education.

The patients evaluated presented one or more comorbidities, obesity 194 (90.23%) the group that had the highest contagion followed by the group of systemic arterial hypertension 62 (28.8%). Obesity is the main risk group for SARS-CoV-2 infection and the development of complications (acute respiratory distress syndrome, multiple organ failure, heart failure, and pneumonia).

In this sense, it is described that in this population the complications found most frequently were acute respiratory distress syndrome: 7 (3.3%), multiple organ failure: 6 (2.8%), heart failure: 6 (2.8%), pneumonia: 4 (1.9%), and that mortality was 8 (3.7%), the groups with the highest mortality were hypertensive and obese.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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