

Estudio de caso: El hogar como principal foco de transmisión del SARS-CoV-2**Case study: Household as a main place for SARS-CoV-2 transmission****Estudo de caso: O domicílio como principal local de transmissão do SARS-CoV-2**

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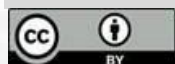
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Resumen

Introducción: Comprender la transmisión del SARS-CoV-2 es fundamental para identificar entornos de alto riesgo y diseñar e implementar medidas preventivas eficaces para limitar la exposición al virus. El objetivo fue describir las características epidemiológicas y clínicas de los casos confirmados de COVID-19.

Descripción de los casos: Se seleccionaron casos de la población que solicitó atención médica en los Servicios Médicos de la Universidad Juárez Autónoma de Tabasco. **Intervenciones realizadas:** De marzo a diciembre de 2020, se registraron 171 casos confirmados de COVID-19. **Resultados:** El 57.3% de los casos identificó su hogar como el lugar más probable de infección, el 20.4% identificó lugares externos y el 22.2% no pudo identificar el lugar de infección. En cuanto a los contactos de riesgo, el 57.9% de los casos tuvo contacto previo con casos confirmados o sospechosos de COVID-19, mientras que el 42.1% no pudo identificar ninguna exposición. La fiebre, la tos y el malestar general fueron los síntomas más frecuentes. La obesidad, la hipertensión arterial y la diabetes mellitus tipo 2 fueron las comorbilidades más comunes. El 29,8% de los casos requirieron hospitalización, con una estancia media de 9 días. La tasa de letalidad general fue del 15,2%. **Conclusiones:** Los resultados respaldan la necesidad de reforzar las estrategias de comunicación centradas en limitar la transmisión del SARS-CoV-2 dentro del hogar.

Palabras clave: Transmisión, COVID-19, Epidemiología

Abstract

Background: Understanding SARS-COV-2 transmission is paramount in order to identifying high risk settings and to design and implement effective preventive measures for limiting exposure to the virus. To describe epidemiological and clinical characteristics of confirmed cases of COVID-19. **Case description:** Cases were selected from the population demanding health care to Medical Services from Juarez Autonomous University of Tabasco. **Interventions carried out:** From March to December of 2020, 171 confirmed cases of COVID-19 were recorded. **Results:** 57.3% of cases identified their homes as the most likely place of infection, 20.4% identified external locations, and 22.2% could not identify the place of infection. As for risk contacts, 57.9% of cases had previous contact with confirmed or suspected COVID-19 cases, whereas 42.1% could not identify any exposure. Fever, cough and general malaise were the most frequent symptoms. Obesity, high blood pressure, and Type 2 Diabetes Mellitus were the most common comorbidities. 29.8% of cases required hospitalization with an average hospital stay of 9 days. Overall case fatality rate was 15.2%. **Conclusions:**

Results support the need to strengthen communication strategies focused on limiting the transmission of SARS-CoV-2 within the household.

Keywords: Transmission, COVID-19, Epidemiology

Resumo

Enquadramento: A compreensão da transmissão do SARS-CoV-2 é fundamental para identificar ambientes de alto risco e para conceber e implementar medidas preventivas eficazes que limitem a exposição ao vírus. Descrever as características epidemiológicas e clínicas dos casos confirmados de COVID-19. **Descrição dos casos:** Os casos foram selecionados da população que procurou atendimento nos Serviços Médicos da Universidade Autónoma de Juárez de Tabasco. **Intervenções realizadas:** De março a dezembro de 2020, foram registados 171 casos confirmados de COVID-19. **Resultados:** 57,3% dos casos identificaram as suas residências como o local mais provável de infeção, 20,4% identificaram locais exteriores e 22,2% não conseguiram identificar o local de infeção. Quanto aos contactos de risco, 57,9% dos casos tiveram contacto prévio com casos confirmados ou suspeitos de COVID-19, enquanto 42,1% não conseguiram identificar qualquer exposição. Febre, tosse e mal-estar geral foram os sintomas mais frequentes. A obesidade, a hipertensão arterial e a diabetes mellitus tipo 2 foram as comorbilidades mais comuns. 29,8% dos casos necessitaram de hospitalização, com uma média de internamento de 9 dias. A taxa de letalidade global foi de 15,2%. **Conclusões:** Os resultados reforçam a necessidade de reforçar as estratégias de comunicação focadas na limitação da transmissão do SARS-CoV-2 dentro dos agregados familiares.

Palavras-chave: Transmissão, COVID-19, Epidemiologia

Background

On December of 2019 China notified the presence of cases of atypical pneumonia om Wuhan, Province of Hubei (World Health Organization [OMS], 2022). In the following months, a new disease called COVID-19 was initially declared as a Public Health Emergency of International Concern and later as a pandemic (OMS, 2020).

In Mexico, the first confirmed case was notified on February 27, 2020. In Tabasco, a southwestern state in the Gulf of Mexico, first cases were identified on March 18, 2020. As expected, incidence cases and deaths rapidly increased, notably among population with comorbidities (Bulut y Kato, 2020).

A virus's ability to transmit depends on various factors in its interaction with the host and the environment, which allows it to spread the infection and survive outside a host, depending on environmental variables such as temperature, humidity, and pH (El Jaddaoui, et al, 2025).

Virus transmission occurs in households despite recommendations regarding hygiene habits and the use of protective equipment that were given to the population as preventive measures against infection. Scientific evidence presents statistically significant results regarding the risk of infection among household contacts, identifying intrafamilial transmission as the setting where most infections occurred (Derqui, 2023).

According to scientific evidence, older adults with chronic illnesses have been considered the most vulnerable population requiring home care. Therefore, the COVID-19 pandemic increased the need for home care in these age groups (Blanco, Henao y Ovalle, 2021).

This research offers value by evaluating data from a retrospective perspective, considering that the data obtained in 2020 were assessed within the current context. Thus, its contribution to regional epidemiology allows for an objective visualization of the behavior of SARS-CoV-2 in the domestic environment of southeastern Mexico, offering lessons learned about structural vulnerabilities and persistent hotspots of contagion that serve as a reference for the control of respiratory diseases.

Epidemiological studies shed valuable evidence both for general understanding of phenomena, but more important for decision-makers in the task of improving control and management of emergencies. To describe epidemiological and clinical characteristics of confirmed cases of COVID-19.

Case description

Here, we describe epidemiological and clinical characteristics of confirmed cases of COVID-19 demanding medical early attention at Medical Services from Juárez Autonomous University of Tabasco (UJAT) in the initial days of the pandemic.⁴

We performed a descriptive, cross-sectional epidemiological study on medical records of laboratory-confirmed cases of COVID-19, identified from March through December of 2020 by UJAT Medical services in Tabasco, México. Inclusion criteria were as follows: Age of 18 and older, diagnosis of probable case and RT-PCR positive test, according to national guidelines, complete epidemiological questionnaire. Cases were excluded when no confirmatory test was performed. In order to identify exclude other respiratory diseases, cases were diagnosed by using rapid diagnostic antigen tests or PCR, in accordance with the guidelines in place during the pandemic.

According to the overall study timeline, the sequence applied for this study begins with the notification in December 2019 of atypical pneumonia cases in Wuhan, China; the first confirmed case of COVID-19 in Mexico on February 27, 2020; the identification of the first cases in the state of Tabasco on March 18, 2020; and the study period from March to December 2020, during which 301 probable cases sought medical attention at the Medical Services of the Juárez Autonomous University of Tabasco (UJAT). Of these, 130 cases were excluded (48 due to incomplete information and 82 due to lack of RT-PCR testing), resulting in a final sample of 171 laboratory-confirmed cases.

In this regard, at the beginning of the exposure phase, 57.3% were infected within the home by living with a suspected or confirmed case. During the symptomatic phase, the predominant symptoms for which patients sought medical services were fever, cough, general malaise, and headache. Regarding clinical management, 70.1% of cases were managed on an outpatient basis, while 29.8% required hospitalization due to severity or comorbidities. The average hospital stay was 6 days, 76.5% required admission to critical care units, and the case fatality rate was 15.2%.

A descriptive analysis of frequencies and proportions was performed using SPSS v.19 software. Ethical considerations: All participants granted authorization for the use of their records for research purposes.

Interventions carried out

Out of 301 probable cases demanding medical attention at UJAT Medical Services in the study period, 130 cases were excluded (48 due to incomplete information or lack and further 82 due to lack of RT-PCR). The final sample consisted of 171 cases.

Table I shows that in our population, 52.6% were male; and the mean age of 51.03 years (SD = 17.36, range = 18-89) and over half of cases had an age of 50 and under.

As for exposure (Table II), 77.8% of cases identified the most likely setting where they got infected, being the household the most frequent place (57.3%), followed by the working place (18.1%), and training places (2.2%). Around one fifth of cases could not identify the place of exposure. In a similar manner, 25.7% identified previous contacts with suspected cases, 32.16% with confirmed cases, but 42.1% could not identify any contact with infected persons.

As expected, most frequent symptoms during the initial medical attention were fever (65.5%), cough (56.1%), general discomfort (54.4%), headache (52.6%), and odynophagia (37.4%). Nonetheless, in our sample, anxiety was notoriously present in 22.8% of cases (Table S1). The most frequent comorbidities (Table S2) were obesity (31.6%), high blood pressure (29.8%), Type 2 Diabetes Mellitus (29.2%), asthma (7.6%) and heart diseases (6.4%). As for the clinical outcomes (Table III), most of the cases were managed as ambulatory, while nearly one third required to be hospitalized with a mean stay of 6 days (range: 1-45). 39 out of 51 hospitalized cases (76.5%) required ICU. 49.01% of all hospitalized and 51.28 of ICU patients died, for an overall case mortality rate of 15.2%.

Pharmacological management of ambulatory patients primarily consisted of symptomatic treatment with analgesics. Nonetheless, antibiotics and antivirals—notably azithromycin and oseltamivir—were widely prescribed despite lacking formal support in national guidelines at that time. This intervention pattern reflects the clinical reality and therapeutic uncertainty of the early pandemic phase in 2020. The use of oseltamivir was initially justified by physicians to cover potential influenza co-infection or misdiagnosis during the seasonal transition, while azithromycin was empirically prescribed due to early, non-conclusive reports suggesting immunomodulatory properties and to prevent secondary bacterial complications in acute respiratory presentations before definitive RT-PCR confirmation was obtained. Treatments were administered according to the following criteria: azithromycin treatment was standard (1 tablet of 500 mg for 3 days), and

oseltamivir treatment was the standard treatment used for influenza (1 capsule of 75 mg every 12 hours for 5 days).

Table 1. *sample characteristics*

Variables		Frequency	%
Sex	Female	81	47.4
	Male	90	52.6
Age groups	18 to 20	4	2.3
	21 to 30	15	8.8
	31 to 40	38	22.2
	41 to 50	31	18.1
	51 to 60	27	15.8
	61 to 70	27	15.8
	71 to 80	19	11.1
	81 to 90	10	5.8
Mean Age		SD	Range
51.03		17.36	18-89

Note. SD= Standard Deviation

Table 2. *Exposure characteristics*

I.	Place of exposure	Frequency	%
	Household	98	57.3
	Working place	31	18.1
	Training place	4	2.3
	Unknown	38	22.2
II.	Contact with cases	Frequency	%
	Suspected case	44	25.7
	Confirmed case	55	32.1
	Not identified	72	42.1

Table 3. Medical management of the study population

<i>Management</i>	<i>Frequency</i>	<i>%</i>	<i>Deaths</i>	<i>Lethality (%)</i>
Ambulatory	120	70.1	1	0.83
Hospitalized	51	29.8	25	49.01
Hospital	12	23.5	5	41.66
Intensive Care Unit	39	76.3	20	51.28
Total	171	100	26	15.20

Table S1. Initial symptoms of the study population

Variables	Frequency	%
Fever	112	65.5
Cough	96	56.1
General discomfort	93	54.4
Headache	90	52.6
Odynophagia	64	37.4
Muscle pain	63	36.8
Joint pain	51	29.8
Breath difficulty	48	28.1
Anxiety	39	22.8
Diarrhea	37	21.6
Rhinorrhoea	29	17.0
Vomit	29	17.0
Abdominal pain	26	15.2
Chills	21	12.3
Irritability	19	11.1
Anosmia	17	9.9
Dysgeusia	14	8.2
Asymptomatic	12	7.0
Fatigue	11	6.4
Polypnea	10	5.8
Weakness	5	2.9
Chest pain	4	24.6
Conjunctivitis	2	1.2

Table S2. *Comorbidities in the study population*

Comorbidities	Frequency	%
Obesity	54	31.6
Obesity	54	31.6
HBP	51	29.8
T2DM	50	29.2
Asthma	13	7.6
Heart diseases	11	6.4
COPD	3	1.8
CKD	2	1.2

Note. COPD = Chronic Obstructive Pulmonary disease, HBP = High Blood Pressure, CKD = Chronic Kidney Disease, T2DM = Type 2 Diabetes mellitus

Regarding treatment safety, the reviewed institutional medical records and epidemiological questionnaires did not exhibit documented reports of specific adverse drug events or secondary pharmacological complications directly attributed to the therapies prescribed; however, any severe clinical deterioration resulting from overall complications is accounted for within the hospitalization and intensive care unit admission rates.

Ethical considerations

This research considered the health research regulations, obtaining informed consent from the patients included in the research and protecting their identity, being used for health research purposes.

Discussion

COVID-19 has been a main cause of disease burden around the world^{7,8} and non-communicable diseases have been associated to a higher risk for unfavorable clinical outcomes (Kolifarhood, 2020).

In general, our results are consistent with others in terms affected population, age, gender, reported symptoms and comorbidities (Secretaría de Salud, 2023). Nonetheless, it is notorious that anxiety, which has been reported as a long COVID symptom (Sun, et al., 2020), was present in the acute phase of the disease in one of every five cases in our study. It is possible that this symptom was a result of the individuals concern of confirming a new and mostly unknown disease, and not as a pathophysiological manifestation of the current infection (Niemi, Daly y Ganna, 2022).

Most of our cases were individuals in economic productive age, but as for socioeconomic variables, but one third (56/171) were older than 60 years. This high frequency might be due to the fact than most of individuals in those ages lived with their younger relatives in the same house (Ruiz-Quñones, et al., 2021)).

A relevant finding in our study is that the risk of getting infected at home was 2.16 times higher than in the working site. This is important because despite the existence extensive health promotion of preventive measures, most of them were focused mainly on public or working places and not necessarily on the possibility of in-house transmission (Costa, et al., 2020). We consider that focusing health promotion on domestic transmission of respiratory viral diseases should be encouraged, especially in societies where extended families, where economically active young adults and elder people cohabit (Guzmán-Olea, et al., 2020).

The limitations of this study deserve consideration for future research that contributes to the scientific evidence. It should be noted that the present study was strengthened by the use of strict inclusion criteria, confirmed by laboratory RT-PCR, which ensured high diagnostic specificity, effectively eliminating the misclassification bias common in initial pandemic records. Furthermore, the detection and analysis of a high prevalence of anxiety (22.8%) during the acute phase of infection offers a novel clinical perspective, demonstrating that psychological distress was deeply linked to the physical onset of the disease.

Additionally, it provides a solid retrospective basis of regional epidemiological value regarding the dynamics of intrafamilial transmission in the state of Tabasco. Among the limitations is the retrospective and cross-sectional design of the study, based on existing medical records, which prevented the creation of individual

patient timelines. Furthermore, the absence of an active pharmacovigilance protocol within the institutional registry limited our ability to systematically monitor specific mild to moderate adverse reactions related to empirical therapies.

Another limitation is the possibility of recall bias among participants; due to the enormous impact of the pandemic and the continuous messages they may have received during their illness. Similarly, bias due to perceived risk in certain locations could have influenced the recording of the place of exposure.

Finally, given that this is a single-center study focused exclusively on the population seeking care at UJAT medical services, the generalizability of the results to a broader national level should be interpreted with caution.

Conclusions

Understanding transmission and clinical features of emerging and re-emerging diseases is essential for implementing effective countermeasures and avoiding non favorable outcomes for individuals and in a larger extent for populations.

Recognizing that transmission of infectious respiratory diseases such as COVID-19 occurs in family settings is critical for the disease control, and it must be addressed by enforcing specific preventive measures such as the use of mask by all cohabitants in the domestic environment when a case of viral respiratory disease is suspected and ultimately confirmed.

Declaration of conflicts of interest

The authors declare no conflicts of interest.

Artificial Intelligence usage statement

The authors declare that they did not use Artificial Intelligence in the preparation of the manuscript.

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Authors 'contributions

A.C.C.: Conceptualization, design, analysis, and drafting of the original manuscript.

J.A.F.L.: Analysis, design, development, and revision of the original manuscript.

B.S.B.: Data design and analysis.

M.I.G.F.: Data design and analysis.

All authors reviewed and approved the final version of the manuscript and assume responsibility for its content.

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