The COVID-19 Pandemic Influencing Prehospital Delay Among Older Adult Patients with Acute Coronary Syndrome Seeking Emergency Care

Title Page

WHAT'S KNOWN?

- The prevalence of prehospital delay is high among older adults with acute coronary syndrome (ACS), resulting in adverse health outcomes.

WHAT'S NEW?

- Being widowed, education, pain intensity, the gradual onset of ACS symptoms, symptoms lasting for more than 30 minutes, feeling anxious about their ACS symptoms due to the COVID-19 pandemic, perceiving their symptoms as dangerous due to the COVID-19 pandemic, history of myocardial infraction (MI), and mode of transportation were all associated with the time taken before seeking emergency care among older adults with ACS during the COVID-19 pandemic.
- Length of prehospital delay among the participants varied according to certain sociodemographic and clinical characteristics and biomarkers.

Abstract

Background: The prevalence of prehospital delay is high among older adults with acute coronary syndrome (ACS), resulting in adverse health outcomes. The current study aimed to examine the associated factors of prehospital delay among patients with ACS during the COVID-19 pandemic. **Methods**: This cross-sectional study was conducted on a convenience sample of 300 older adults with ACS admitted to the emergency department. Bivariate and multivariate analyses, including stepwise linear regression, were used to explore the predictors of prehospital delay and length of stay. **Results:** Being widowed, education, pain intensity, the gradual onset of ACS symptoms, symptoms lasting for more than 30 minutes, feeling anxious about their ACS symptoms due to the COVID-19 pandemic, perceiving their symptoms as dangerous due to the COVID-19 pandemic, history of myocardial infraction (MI), and mode of transportation were all associated with the time taken before seeking emergency care among older adults with ACS during the COVID-19 pandemic. **Conclusion**: Length of prehospital delay among the participants varied according to certain sociodemographic and clinical characteristics and biomarkers. Improved understanding of the associations between prehospital delay and these characteristics is crucial for achieving optimal ACS patient outcomes under the impacts of the COVID-19 pandemic.

Keywords: COVID-19 Pandemic; Prehospital Delay; Older Adult; Acute Coronary Syndrome; Emergency Care

Background

The Corona Virus Disease 2019 (COVID-19) pandemic has led to many negative impacts on the provision of healthcare in healthcare facilities. Healthcare providers (HCPs) working in emergency departments (EDs) have become highly concerned with screening patients for actual or suspected infection with COVID-19, which has resulted in the diversion of healthcare efforts, resources, and services. Consequently, for older adult patients with acute coronary syndrome (ACS), the opportunity to arrive at EDs without delay and receive appropriate medical interventions in a timely manner might be negatively impacted. Therefore, significant attention should be paid by HCPs on minimizing the delay in the arrival of older adult ACS patients at the appropriate healthcare facilities or hospitals for advanced medical evaluations.

For ACS patients, the delay in arriving at hospital, otherwise referred to as prehospital delay, refers to the time between the onset of ACS symptoms and hospital admission.[1] ACS-related prehospital delay occurs when ACS symptoms last for 6 or more hours prior to the arrival of the patient at hospital.[2] Prehospital delay has numerous adverse outcomes among older adults seeking emergency care and places an extra burden on HCPs. For instance, prehospital delay of more than 2 hours has been shown to be associated with increased mortality rates and the reduced probability of revascularization among patients with ACS.[1] For HCPs working during the COVID-19 pandemic, protecting older adult patients with ACS from becoming infected with COVID-19 calls for intensified treatment procedures and thus increases the burden on HCPs.

A previous study found that delay in ambulance response had led to the death of an 80-year-old patient with cardiac events who had been receiving home palliative care.[3] Ambulance delay may occur as a result of patients or their families waiting for several hours before calling for help, the ambulance taking hours to arrive, or the inappropriate categorization of the patient.[3]

Therefore, if the patient or caregiver informs the emergency call-taker that the patient has a history of cardiac disorders, an ambulance may be sent in a more timely manner.[4]

Prior to the COVID-19 pandemic, numerous studies had addressed prehospital delay among patients with ACS. The median prehospital delay was approximately 5 hours, with decision time being the main contributor to this delay.[5] In a previous study, calling a medical practitioner for advice before calling for emergency care and having previous knowledge of the opening times of healthcare facilities were contributing factors to prolonged prehospital delay among patients.[5] The average prehospital delay among European patients was reported to be about 2.3 to 2.7 hours for ST elevation myocardial infraction (STEMI) patients, and about 2.7 – 3.1 hours for non-ST elevation myocardial infraction (NSTEMI) patients.[5] Moreover, about 64% of patients with heart attack who had diabetes and about 58% of patients with heart attack who were nondiabetic were found to have experienced prehospital delay of more than 2 hours.[6]

Numerous factors have been found to be associated with prehospital delay, including race, smoking, diabetes, related symptoms,[7] alcoholism, progression and interpretation of symptoms, at-home symptom relief measures, money issues, poor consultation services at some healthcare facilities, place of symptom onset, and method of transportation to hospital.[8] However, under the impacts of the COVID-19 pandemic, the role played by these different factors in causing prehospital delay among patients with ACS may have been exacerbated.

During the COVID-19 pandemic, increased prehospital delay may be related to the increased delay in the patient seeking healthcare and the delay in transportation to the hospital. Investigating the factors that impact the delay in seeking healthcare and transportation to hospital is necessary for the implementation of effective interventions aimed at reducing prehospital delay and thus reducing negative outcomes during the COVID-19 pandemic. Therefore, this

study aimed to 1) explore the significant predictors of prehospital delay among older adults with ACS seeking emergency medical care during the COVID-19 pandemic; and 2) identify the association of intensive care unit length of stay (ICU LOS) and hospital length of stay (hospital LOS) with the socio-demographic and health factors of older adults with ACS seeking emergency medical care during the COVID-19 pandemic.

Methods

Design and Sample

A cross-sectional design was used to identify the predictors of prehospital delay and its associations with ICU LOS and hospital LOS among 300 older adult patients (aged 60 years or over) with cardiac events seeking emergency healthcare during the COVID-19 pandemic. Convenience sampling was used to recruit participants from the ED of a large referral hospital for all public sectors in the Northern region of Jordan between June 1, 2020 and September 1, 2020. Participants were included in the study if they were speakers of Arabic, had no hearing impairments, and were able to give consent.

Data Collection

A structured questionnaire was created by the authors for use during the face-to-face interviews in order to collect data on the socio-demographic and health characteristics of the participants. The questionnaire, in addition to the patients' health records, was used to collect data on age, gender, marital status, education, prehospital delay (defined as the time between the onset of ACS symptoms and calling for emergency healthcare services), length of stay, smoking history, time variables, and biomedical indicators at admission, such as cardiac enzymes, white blood cells, red blood cells, hemoglobin, hematocrit, platelets, HbA1C, glucose, blood urea nitrogen, creatinine, uric acid, sodium, and potassium.

Data Analysis

The assumptions of normality, linearity, homogeneity, and homoscedasticity were checked. The Spearman rho', Mann-Whitney, and ANOVA with Tukey as a post-hoc tests were used to examine the associations between the selected health variables and the time taken before seeking emergency care. Thereafter, multivariate analysis, including linear regression models, was conducted in order to identify the predictors of prehospital delay and hospital and ICU LOS during the COVID-19 pandemic. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25 (SPSS, Inc, Chicago, Ill), with a significance level of .05.

Ethical Considerations

After obtaining institutional review board (IRB) approval (#20200293) from both the Jordan University of Science and Technology and the selected hospital, informed consent was obtained from the participants prior to data collection. An anonymous and structured questionnaire interview was conducted with each of the participants. Data were kept confidential and coded in a password-protected computer located in the principal investigator's office.

Results

The participants' ages ranged between 60 and 98 years, with an average age of 70 years (SD=8.533). Approximately two thirds (70.7%) of the participants were male, 73.7% were married, 63.7% were living in rural areas, and 70.3% were living alone. Approximately one-third of the participants (29.3%) had basic education (up to 6th grade), and approximately half of the participants (48%) were retired. Most of the participants (60%) had suffered from chest pain prior to them arriving at the ED, with an average pain intensity of 4.09 out of ten (See Table 1).

For approximately half of the participants (43.3%), the onset of chief complaints had developed gradually a few minutes before them seeking emergency care. Around 60% of the participants had suffered from their symptom for more than 30 minutes before calling for emergency care. Around half of the participants (53.7%) were brought to the ED by car, and around a third of the participants (30.3%) had arrived at the ED between 6 and 12 pm. Most of the participants (86.7%) lived more than 5 km away from the hospital. Among the participants, the average number of days taken before seeking emergency care was 3.36 days (SD=8.94), the average number of minutes between seeking emergency care and arriving at the hospital was 48.95 minutes (SD=30.15), and the average number of minutes between arriving at the ED and receiving emergency care was 17.21 minutes (SD=7.23) (See Table 1). About a third of the participants (38.7%) had felt anxious of their symptoms at the ED and 55.3% had perceived their symptoms to be particularly dangerous in light of the COVID-19 pandemic. In addition, the average ICU LOS was 0.69 days (SD=1.44), and the average total hospital LOS was 2.493 days (SD=3.41) (See Table 1).

INSERT TABLE 1 HERE

The bivariate analyses for the associations between the participants' demographic and health variables and the time taken before seeking emergency care are presented in Table 2. As shown in Table 2, being widowed was significantly and negatively associated with the time taken before seeking emergency care, with widowed participants taking four and half days less than married participants (p=0.002). Education was significantly and positively associated with the time taken before seeking emergency care, with the *P* values for the different levels of education all being significant and ranging from less than 0.001 to 0.03. Pain intensity out of ten was also significantly and negatively associated with the time taken before seeking emergency

care (rho=-0.441, p<0.001).

The gradual onset of ACS symptoms within days was significantly and negatively associated with the time taken before seeking emergency care, compared to the abrupt onset of symptoms (Post hoc: Tukey=-6.41, p<0.001) and the gradual onset of symptoms within minutes (Post hoc: Tukey =-4.14, p=0.002). The time (days) taken before seeking emergency care was significantly higher among participants whose symptoms had lasted for more than 30 minutes (Mean=4.05, SD=9.26) compared to participants whose symptoms had lasted for less than 30 minutes (Mean=2.23, SD=8.29, Mann-Whitney=7657, p<0.001).

The bivariate analysis also indicated that participants who had felt anxious about their ACS symptoms due to the COVID-19 pandemic had taken a significantly lower number of days before seeking emergency care (Mean=1.78, SD=5.75) than participants who had not felt anxious (Mean=4.36, SD=10.35, Mann-Whitney=6868.5, p<0.001). In addition, participants who had perceived their symptoms to be particularly dangerous in light of the COVID-19 pandemic had taken a lower number of days before seeking emergency care (Mean=2.65, SD=7.56) than participants who had not perceived their symptoms to be dangerous (Mean=4.25, SD=10.36, Mann-Whitney=8392, p<0.001). Participants who had a history of myocardial infraction (MI) had taken a lower number of days before seeking emergency care (Mean=2.1, SD=5.54) compared to participants who had no history of MI (Mean=4.24, SD=10.61) (Mann-Whitney=9301, p=0.032).

Moreover, the bivariate analysis also indicated that older adults who were admitted to the hospital after seeking emergency had taken less time (days) to seek emergency care (Mean=1.8, SD=5.64) compared to patients who were not admitted to the hospital (Mean=4.64, SD=10.77) (Mann-Whitney=7142.5, p<0.001). Finally, the bivariate analysis also indicated that there were

significant associations between the time taken before seeking emergency care and each of ICU LOS (rho=-0.278), hospital ICU (rho=-0.337), troponin concentration at the ED (rho=-0.224), creatine kinase-MB (CKMB) concentration at the ED (rho=-0.255), red blood cell (RBC) concentration at ED (rho=-0.163) and hemoglobin (HB) concentration at the ED (rho=-0.118) (See Table 2).

INSERT TABLE 2 HERE

Participants who had used public transportation had taken 13.16 minutes less time to arrive at hospital than participants who had used an ambulance (P=0.03, Table 3). In addition, the time (minutes) taken to arrive at the hospital was lower among participants who lived less than 5 km away from the hospital (Mean=17.425, SD=11.024)) compared to participants who lived more than 5 km away from the hospital (Mean=53.8, SD=29.22) (Mann-Whitney=643.5, $p<0.001$).

INSERT TABLE 3 HERE

In the present study, the gradual onset of symptoms within a few days ($p<0.001$), education (Illiterate, p=0.011), and marital status (Widow, p=0.02) were significant predictors of the time taken before seeking emergency care (see Table 4), whereby the model of these predictors explained 11.6% of the variation in the dependent variable (Adjusted $R^2=0.116$).

INSERT TABLE 4 HERE

As presented in Table 5, pain intensity out of ten ($p<0.001$), age ($p<0.001$), history of MI (p=0.001), perceiving symptoms to be dangerous in light of the COVID-19 pandemic (p=0.044), and the gradual onset of symptoms within a few days (p=0.047) were found to be significant predictors of hospital LOS. The model explained 40.4% of the variation in the dependent variable (Adjusted $R^2=0.404$). As with regards to the model of the predictors of ICU LOS (See

Table 6), pain intensity out of ten (P<0.001), age (p=0.001), the gradual onset of symptoms within a few days (p=0.006), and the use of private means of transportation to hospital (p=0.034) were found to be significant predictors.

INSERT TABLE 5 HERE

INSERT TABLE 6 HERE

Discussion

The present study revealed that the average time taken before seeking emergency medical care under the COVID-19 pandemic and its related governmental procedures, such as country lockdown, among older adults with ACS was 3.36 days. As opposed to the abrupt onset of symptoms such as chest pain, the gradual onset of symptoms within a few days was associated with a decrease by 6 days in the time taken before seeking emergency care and ICU LOS. Dyspnea was found to be the most common symptom to cause patients to visit the ED. This is in line with a recent study, which reported that dyspnea brought 38% of patients to the ED, followed by nausea and/or vomiting (26%).[9]

Previous studies have reported that prehospital delay can often last for hours or days, which is considered very long.[10,11] Numerous studies conducted prior to the COVID-19 pandemic reported an average delay time of a few hours before the arrival of the patient at the ED.[12,13] For example, in the study of Evie et al.[12], most patients were found to have arrived at the hospital within 3 hours of the onset of chest pain, while 14% were found to have arrived within 1 hour. In addition, in a study which involved 829 patients with heart attack, of whom 64% described their heart attack symptoms as being gradual and intermittent, the average delay time before the arrival of the patient at the ED was 2.2 hours.[13] Evie (2017) and colleagues [12]also reported that calling a physician or general practitioner increased the delay in seeking medical attention.

In addition to the onset of symptoms, level of education and marital status were also found to be predictors of the time taken before seeking emergency care. This is partially in concordance with the findings of Eshah's study,[14] whereby education and employment were reported as being contributing factors to prehospital delay. However, it is worth noting that the study was conducted prior to the outbreak of COVID-19 and that most of the study participants were male, married, employed, living in urban areas, of low income, and without medical insurance. Further, most of the participants were younger than 60 years. Eshah[14] also reported that only 28% percent of patients with acute MI had arrived at the hospital within the first 60 minutes of the onset of acute symptoms, while 58.7% and 41% had arrived within 6 hours and after 6 hours of symptom onset, respectively. On the contrary, in the study of Nilsson et al.,[1] low education level and lack of proper employment were not found to be contributing factors to prehospital delay.

In our study, age was not found to be a predictor of the time taken before seeking emergency care among the participants. Prior to the COVID-19 pandemic, the variables that predicted the delay in making the decision to seek medical attention among women and men suffering from acute heart attack symptoms were age, anxiety, hope that the symptoms will subside, and psychological factors.[15] Older MI patients have previously been reported to take more time than younger patients before seeking emergency medical care for heart attack.[16] In comparison to younger MI patients, elderly MI patients were reported to be more likely to express atypical acute MI symptoms and suffer from more comorbidities, hence explaining the increased delay in them seeking medical attention.[17] Further, the COVID-19 pandemic may have rendered hospitals an unsafe environment for older adults, therefore making elderly patients reluctant to seek emergency medical care and increasing prehospital delay.

Meanwhile, age was found to be a significant predictor of hospital LOS and ICU LOS among the participants. Patients aged 65 years or over comprise nearly 40% of hospitalized adults and are around three times more likely to be hospitalized than patients aged between 45 and 64 years,[18] with cardiovascular diseases being the leading cause (28.6%) of hospital admission among community-dwelling older adults.[19] Therefore, it can be concluded that advanced age is a constant variable of hospital admission, both before and after the outbreak of the COVID-19 pandemic.

The intensity of chest pain was a significant predictor of hospital LOS and ICU LOS, which is consistent with findings reported prior to the COVID-19 pandemic. For example, Holmberg and colleagues [20] reported that the intensity of chest pain, in addition to heart-related complications before hospital admission, heart failure, and anxiety, is associated with prolonged hospitalization. As a result, the intensity of chest pain among older adult patients may be an indicator of possible adverse outcomes and the patient's need for urgent care.[21] Another predictor of hospital LOS among the participants was history of MI. Prior to the pandemic, previous studies had reported that patients with ACS usually sought emergency care if they were certain about their symptoms, particularly in cases where the patient is familiar with the symptoms or has a previous heart attack experience.[22]

In the present study, perceiving ACS symptoms to be dangerous in light of the COVID-19 pandemic was a predictor of prolonged hospital LOS. Environmental stressors have been found to be correlated with prolonged LOS among patients admitted to intensive care units,[23] and the COVID-19 pandemic may be considered a major environmental stressor for older adults with ACS. Moreover, older adults who live with caregivers may be hindered from seeking emergency

medical care due to COVID-19-related stress experienced by their caregivers. Caregiver stress has been reported to be a possible risk factor for prolonged LOS among older adult patients.[24]

Our results have shown the use of public transportation to travel to hospital to be more effective than using an ambulance in reducing the time needed to arrive at hospital during the COVID-19 pandemic. This may be related to the high demand for ambulance services as a result of the high numbers of COVID-19 cases or patients who require urgent medical care during national lockdowns. Prior to the pandemic, older patients with MI may have preferred calling for an ambulance immediately after the onset of MI symptoms, probably due to them having ambulance services covered by their insurance, knowing that travelling to hospital by ambulance is more effective than travelling by other means of transport, and not having any other means of transport.[25] High-intensity chest pain may also prompt patients to call for ambulance services.[25]

In contrast to our findings, a previous study conducted prior to the COVID-19 pandemic found travelling to hospital by ambulance to be associated with approximately half an hour reduction in prehospital delay, as compared to using private transport.[26] Moreover, patients who used an ambulance were more likely to pass through the triage process, leading to efficient and early electrocardiogram (ECG) assessment and reperfusion delivery for these patients.[26] Moreover, level of education,[26] age, and gender[22] were not previously found to be influencing variables on the use of ambulance services among patients with ACS.[26] This necessitates the enhancement of public education, prehospital care, patient flow, and ED environment management.[8]

The current study is the first of its kind to examine the impact of the COVID-19 pandemic on prehospital delay among older adults with ACS seeking emergence care. However, the use of a cross-sectional design did not allow for studying the causal relationships between the

variables and evaluating the variables simultaneously. Further, collecting data during a public emergency may have led to variations in the participants' responses to the structured interview questions and may limit the generalizability of the findings. Thus, longitudinal studies which address other adverse outcomes and variables related to hospitalization are recommended.

Conclusion

In summary, the present study found the average time of prehospital delay among ACS patients during the COVID-19 pandemic to be longer than the average time of prehospital delay reported by studies conducted prior to the pandemic. Further, prehospital delay among the participants was found to vary according to certain sociodemographic and clinical characteristics and biomarkers. Method of transport and distance to hospital were found to be significantly associated with the time taken to arrive at hospital. The onset of symptoms, marital status, and level of education were found to be significantly associated with time taken before seeking emergency care. The onset and perception of the danger of symptoms, history of ACS, age, and pain intensity were found to be significantly associated with prolonged hospital LOS. Finally, pain intensity, age, onset of symptoms, and the use of private means of transportation to hospital were found to be significantly associated with ICU LOS. An improved understanding of these associations is crucial for optimal patient outcomes, and intervention studies that target prehospital delay among patients with ACS are highly recommended.

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Table 1. Sociodemographic, time variables, and health characteristics of older adults with ACS seeking emergency care during the COVID-19 pandemic (*N*=300).

		N (%)	Mean (SD)
Age			70.023 (8.533)
Gender			
	Male	212 (70.7)	
	Female	88 (29.3)	
Marital Status			
	Married	221 (73.7)	
	Single	24 (8)	
	Widow	55 (18.3)	
Education			
	Illiterate	37 (12.3)	
	Basic	88 (29.3)	
	Secondary	60 (20)	
	Diploma	67 (22.3)	
	Bachelor	48 (16)	
Employment			
	Employed	48 (16)	
	Housewife	40 (13.3)	
	Retired	144 (48)	
	Not employed	68 (22.7)	
Monthly income (US Dollar)			810.7 (508.6)
Living area			
	Urban	109 (36.3)	
	Rural	191 (63.7)	
Living alone			
	Yes	89 (29.7)	
	No	211 (70.3)	
Health insurance covering			
	Yes	289 (96.3)	
	No	11 (3.7)	
Chief complaint			
	Chest pain	180 (60)	
	Palpitation	61 (20.3)	
	General weakness	59 (19.7)	
Pain scale			4.09 (2.436)
Onset of the symptom			
	Abrupt	80 (26.7)	
	Gradually within minutes	130 (43.3)	
	Gradually within days	90 (30)	
Duration of the symptom			
	Less than 30 minutes	133 (37.7)	
	More than 30 minutes	187 (62.23)	
Method of Transportation			
	Ambulance	82 (23.7)	

	Car	161 (53.7)
	Public transportation	57 (19)
Time of arrival		
	6AM-12MD	76 (25.3)
	12MD-6PM	65 (21.7)
	6PM-12MN	91 (30.3)
	12MN-6AM	68 (22.7)
Distance from hospital		
	Less than 5 km	40 (13.3)
	More than 5 km	260 (86.7)
Time taken before seeking emergency medical care (days)		3.36 (8.94)
Time taken to arrive at hospital (minutes)		48.95 (30.146)
Time needed for receiving care at ED (minutes)		17.21 (7.225)
How anxious were you to be at the ED during the COVID-19 pandemic?		
	Very anxious	116 (38.7)
	Not anxious	184 (61.3)
Did you perceive your symptoms to be particularly dangerous in light of the COVID-19 pandemic?		166 (55.3)
	Yes	134 (44.7)
	No	
Associated symptom		
	Dyspnea	192 (64)
	Fatigue	183 (61)
	Sweating	179 (59.7)
	Vertigo	110 (36.7)
	Vomiting	83 (27.7)
History MI		
	Yes	177 (59)
	No	123 (41)
Type of MI		
	Anterior	35 (11.7)
	Posterior	53 (17.7)
	Inferior	87 (29)
	Lateral	63 (21)
Current smoker		
	Yes	210 (70)
	No	90 (30)
Admitted to hospital		
	Yes	135 (45)
	No	165 (55)
Type of ward		
	Intermediate medical unit	70 (52.6)
	Coronary care unit	63 (47.4)

ICU LOS (days)		0.69 (1.438)
Hospital LOS (days)		2.493 (3.414)
Biomedical indicators at ED		
	Troponin	0.264 (0.649)
	CK	198.215 (365.227)
	CKMB	26.258 (36.653)
	WBC	10.178 (5.546)
	RBC	4.617 (0.664)
	HB	13.672 (6.445)
	HCT	41.21 (5.965)
	Platelets	156.161 (82.591)
	BUN	7.298 (5.033)
	Creatinine	109.972 (91.79)
	Glucose	149.625 (48.277)
	Na	139.487 (4.84)
	K	4.431 (0.537)
	Ca	9.286 (0.763)
	HBA1C	7.746 (1.797)

Note: ED: The emergency department; COVID-19: The novel Corona Virus Disease 2019; MI: Myocardial infarction; ICU: Intensive care unit; LOS: Length of stay

482 **Table 2.** Bivariate analysis for the associations between the demographic and health variables of
483 the participants with ACS and the time taken before seeking emergency care during the COVID-
484 19 pandemic (N=300).

	Statistic Tests	Time taken before seeking care Mean (SD) (Days)	p-value
Age	Spearman's rho=-0.014		0.807
Gender	Mann-Whitney=8464		0.206
Female			
Male			
Marital Status	ANOVA: Post hoc: Tukey's		
Married vs. Single		0.45	0.969
Married vs. Widow		-4.56	**0.002**
Single vs. Widow		-5.01	0.51
Education	ANOVA: Post hoc: Tukey's		
Illiterate vs. Basic		5.96	**0.005**
Secondary		5.29	**0.03**
Diploma		7.67	**<0.001**
Bachelor		7.67	**<0.001**
Occupation	ANOVA: Post hoc: Tukey's		
Employee vs. Housewife		-1.25	0.910
Retired		0.069	1.000
Not employee		-3.45	0.162
Income (US Dollar)	Spearman's rho=-0.11		0.058
Type of living area	Mann-Whitney=10675		0.713
Urban			
Rural			
Living alone	Mann-Whitney=9504		0.868
Yes			
No			
Pain scale	Spearman's rho=-0.441		**<0.001**
Onset of the symptom	Post hoc: Tukey		
Abrupt vs. Gradually within minutes		-2.27	0.152
Gradually within days		-6.41	**<0.001**
Gradually within mins vs. Gradually within days		-4.14	**0.002**
Duration of the symptom	Mann-Whitney=7657		**<0.001**
Less than 30 minutes		2.23 (8.29)	
More than 30 minutes		4.05 (9.26)	
How anxious were you to be at the ED during the COVID-19 pandemic?	Mann-Whitney=6868.5		**<0.001**
Very anxious		1.78 (5.75)	
Not anxious		4.36 (10.35)	
Did you perceive your symptoms to be particularly dangerous in light of the COVID-19 pandemic?	Mann-Whitney=8392	2.65 (7.56)	**<0.001**

Yes		4.25 (10.36)	
No			
History of MI	Mann-Whitney=9301		**0.032**
Yes		4.24 (10.61)	
No		2.1 (5.54)	
Smoking	Mann-Whitney=8715		0.285
Yes			
No			
Admitted to hospital	Mann-Whitney=7142.5		**<0.001**
Yes		1.8 (5.64)	
No		4.64 (10.77)	
ICU LOS (days)	Spearman's rho=-0.278		**<0.001**
Hospital LOS (days)	Spearman's rho=-0.337		**<0.001**
Biomedical indicators at ED			
Troponin	Spearman's rho=-0.224		**< 0.001**
CK	Spearman's rho=-0.089		0.125
CKMB	Spearman's rho=-0.255		**< 0.001**
WBC	Spearman's rho=0.071		0.219
RBC	Spearman's rho=-0.163		**0.005**
HB	Spearman's rho=-0.118		**0.042**
HCT	Spearman's rho=-0.100		0.085
Platelets	Spearman's rho=-0.049		0.398
BUN	Spearman's rho=0.058		0.314
Creatinine	Spearman's rho=0.070		0.226
Glucose	Spearman's rho=-0.020		0.725
Na	Spearman's rho=-0.017		0.763
K	Spearman's rho=0.015		0.799
Ca	Spearman's rho=-0.060		0.361
HBA1C	Spearman's rho=-0.118		0.103

Note: ED: The emergency department; COVID-19: The novel Corona Virus Disease 2019; MI: Myocardial infarction; ICU: Intensive care unit; LOS: Length of stay; CKMB: creatine kinase-MB; RBC: red blood cell

Table 3. The bivariate analysis for the association between living area, living arrangement, method of transportation to and distance from hospital, and the time needed to arrive at hospital during the COVID-19 pandemic (*N*=300).

	Statistic Tests	Time needed to arrive to hospital (Minutes) Mean (SD)	p-value
Living area	Mann-Whitney=11057.5		0.368
Urban		50.312 (29.82)	
Rural		48.173 (30.381)	
Living alone	Mann-Whitney=9532		0.835
Yes		47.348 (25.231)	
No		49.626 (32.025)	
Method of Transportation	Post hoc: Tukey		
Ambulance vs. Car		-2.862	0.758
vs. Public transportation		-13.156	**0.030**
Car vs. Public transportation		-10.294	0.066
Distance from hospital	Mann-Whitney=643.5		**<0.001**
Less than 5 km		17.425 (11.024)	
More than 5 km		53.8 (29.218)	

Note: COVID-19: The novel Corona Virus Disease 2019.

Table 4. Stepwise linear regression of the predictors of the time taken before seeking emergency care among older adults with ACS during the COVID-19 pandemic (N=300).

Model		Unstandardized	Standard Error	Standardized	t	p
1	(Intercept)	-4610.261	2064.182		-2.233	0.026
	Onset of the symptom	4650.514	952.136	0.272	4.884	**< .001**
2	(Intercept)	1568.460	2733.289		0.574	0.567
	Onset of the symptom	4354.639	940.067	0.255	4.632	**< .001**
	Education (Illiterate)	-1856.973	550.372	-0.186	-3.374	**< .001**
3	(Intercept)	-2780.777	3285.370		-0.846	0.398
	Onset of the symptom (Gradual within few days)	4358.504	933.015	0.255	4.671	**< 0.001**
	Education (Illiterate)	-1465.693	571.120	-0.147	-2.566	**0.011**
	Marital Status (Widow)	2188.641	932.592	0.133	2.347	**0.020**

The last model of the stepwise linear regression of the predictors of the time taken before seeking emergency care explained 11.6% of the variation in the dependent variable (Adjusted R^2=0.116).
COVID-19: The novel Corona Virus Disease 2019.

Table 5. Stepwise linear regression of the predictors of hospital LOS among older adults with ACS seeking emergency care during the COVID-19 pandemic (N=300).

Model		Unstandardized	Standard Error	Standardized	t	p
1	(Intercept)	-0.673	0.322		-2.089	0.038
	Pain intensity out of ten	0.774	0.068	0.552	11.439	**< .001**
2	(Intercept)	-7.765	1.298		-5.984	< .001
	Pain intensity out of ten	0.697	0.066	0.497	10.570	**< .001**
	Age	0.106	0.019	0.264	5.625	**< .001**
3	(Intercept)	-7.799	1.274		-6.121	< .001
	Pain intensity out of ten	0.656	0.066	0.468	9.980	**< .001**
	Age	0.118	0.019	0.295	6.280	**< .001**
	History of MI	-1.119	0.322	-0.162	-3.480	**< .001**
4	(Intercept)	-6.566	1.390		-4.724	< .001
	Pain intensity out of ten	0.607	0.069	0.433	8.780	**< .001**
	Age	0.118	0.019	0.294	6.287	**< .001**
	History of MI	-1.064	0.321	-0.154	-3.317	**0.001**
	Perceiving symptoms to be particularly dangerous in light of the COVID-19 pandemic	-0.710	0.329	-0.104	-2.154	**0.032**
5	(Intercept)	-5.708	1.448		-3.941	< .001
	Pain intensity out of ten	0.554	0.074	0.395	7.505	**< .001**
	Age	0.120	0.019	0.300	6.446	**< .001**
	History of MI	-1.052	0.319	-0.152	-3.295	**0.001**
	Perceiving symptoms to be particularly dangerous in light of the COVID-19 pandemic	-0.664	0.329	-0.097	-2.022	**0.044**
	Onset of the symptom	-0.443	0.222	-0.098	-1.994	**0.047**

The last model of the stepwise linear regression of the predictors of hospital LOS among older adults seeking emergency care during the COVID-19 pandemic explained 40.4% of the variation in the dependent variable (Adjusted R^2=0.404). COVID-19: The novel Corona Virus Disease 2019; MI: Myocardial infarction; LOS: length of stay.

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Table 6. Stepwise linear regression of the predictors of ICU LOS among older adults with ACS seeking emergency care during the COVID-19 pandemic (N=300).

Model		Unstandardized	Standard Error	Standardized	t	p
1	(Intercept)	-0.560	0.139		-4.024	< .001
	Pain intensity out of ten	0.306	0.029	0.518	10.450	**< .001**
2	(Intercept)	-2.721	0.576		-4.725	< .001
	Pain intensity out of ten	0.282	0.029	0.478	9.647	**< .001**
	Age	0.032	0.008	0.191	3.862	**< .001**
3	(Intercept)	-2.080	0.606		-3.433	< .001
	Pain intensity out of ten	0.243	0.032	0.412	7.698	**< .001**
	Age	0.034	0.008	0.203	4.138	**< .001**
	Onset of the symptom	-0.303	0.100	-0.159	-3.039	**0.003**
4	(Intercept)	-1.231	0.722		-1.706	0.089
	Pain intensity out of ten	0.231	0.032	0.392	7.264	**< .001**
	Age	0.029	0.009	0.169	3.306	**0.001**
	Onset of the symptom	-0.279	0.100	-0.146	-2.795	**0.006**
	Method of Transportation	-0.237	0.111	-0.111	-2.133	**0.034**

536 The last model of the stepwise linear regression of the predictors of ICU LOS among older adults
537 seeking emergency care during the COVID-19 pandemic explained 32.5% of the variation in the
538 dependent variable (Adjusted R^2=0.325). COVID-19: The novel Corona Virus Disease 2019;
539 ICU: intensive care unit; LOS: length of stay.
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