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Investigation of the factors affecting the behavior of emergency medicine physicians regarding the giving of acetylsalicylic acid in patients admitting with chest pain

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Abstract

This study aimed to evaluate physician- or patient-based factors influencing physicians' decisions to administer acetylsalicylic acid (ASA) in the early management of patients presenting to the emergency department with chest pain. Designed as a cross-sectional survey study, this research was conducted across Türkiye between November 26, 2020, and July 13, 2021. The study included 351 emergency medicine specialists and 39 general practitioners actively working in emergency departments. Participants were administered a questionnaire consisting of 6 demographic and 36 case-based questions. The study found that ASA was administered at a higher rate to male patients compared to female patients. In male patients with typical chest pain, the rate of ASA administration was 95.8%, while in female patients, it was 16.6% ($p < 0.001$). In male patients with atypical chest pain, the rate of ASA administration was 67.4%, compared to 6.1% in female patients ($p = 0.003$). Physician gender and experience also influenced ASA administration decisions. Male physicians administered ASA 3.2 times more frequently to male patients with atypical chest pain compared to female physicians (OR: 3.2; 95% CI: 1.8-5.6). Additionally, physicians with more than 10 years of experience increased ASA use in patients with comorbidities by 1.8 times ($p = 0.02$). This study is one of the first in Türkiye to examine emergency physicians' ASA administration practices. The findings indicate that physicians tend to administer ASA less frequently to female patients compared to male patients. However, as physicians gain experience and advance in their specialization, their adherence to guideline-based treatment increases. These results highlight the importance of specialization and continuous medical education in medical training.

Keywords: Acetylsalicylic acid, chest pain, emergency medicine, clinical decision making

Introduction

Chest pain is a significant symptom, accounting for 5-10% of emergency department visits and associated with life-threatening conditions such as acute coronary syndrome (ACS) and pulmonary embolism [1]. Acetylsalicylic acid (ASA) is a cornerstone treatment in the early management of ACS, particularly in cases like ST-segment elevation myocardial infarction (STEMI), where it reduces mortality by 23% [2]. However, the use of ASA in non-cardiac causes of chest pain (e.g., gastroesophageal reflux, musculoskeletal pain) may increase the risk of bleeding [3]. Including sex-specific evidence in clinical practice guidelines is integral to attaining the delivery of

personalized medicine. Sound decisions about patient screening, diagnosis, and treatment should be evidence-informed by genetic and sex hormone differences between male and female patients that determine disparate manifestations of disease and drug response [4].

The literature lacks systematic studies examining factors influencing physicians' decisions to administer ASA, such as physician experience, patient gender, and electrocardiogram (ECG) findings. Specifically, there is no comprehensive research on this topic in Türkiye. This study aims to fill this gap by evaluating emergency physicians' ASA administration practices in the context of patient and physician characteristics.

CITATION

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Material and Methods

Study Design and Participants

This cross-sectional study was conducted across Türkiye between November 26, 2020 and July 13, 2021, with the approval of the İstanbul Prof. Dr. Cemil Taşçıoğlu City Hospital Ethics Committee (Decision No: 221, Date: 16/06/2020). The sample of our study conducted in emergency departments included 351 emergency medicine physicians, 39 general practitioners, 1 cardiology physician, 1 internal medicine physician, 4 other branch physicians, and a total of 396 physicians participated. 6 physicians who did not meet the inclusion criteria were excluded, and statistical data were created by including 351 emergency medicine physicians and 39 general practitioners, for a total of 390 physicians.

Data Collection and Questionnaire Structure

Data were collected using a questionnaire consisting of 6 demographic and 36 case-based questions. The scenarios included patient gender, pain characteristics (typical/atypical), comorbidities (diabetes, hypertension), ECG findings (ST elevation, ischemic changes), and troponin levels. Participants were asked to respond with "Yes/No" regarding whether they would administer ASA in each scenario.

Statistical Analysis

PASS Software Trial version ("PASS 15 Power Analysis and Sample Size Software (2017). NCSS, LLC. Kaysville, Utah, USA, ncss.com/software/pass.) program was used to program the sample calculation. Categorical variables were compared using the Chi-Square and Fisher's Exact tests, while multivariate analysis was performed using logistic regression. A significance level of $p < 0.05$ was accepted.

Results

Demographic Characteristics

Of the participants, 62.3% ($n=243$) were male, and 88.5% ($n=345$) were in the 25-40 age range. Additionally, 51.8% ($n=202$) of the physicians had less than 5 years of emergency department experience.

ASA Administration Practices

In cases of typical chest pain, the rate of ASA administration was 95.8% ($n=369$) for male patients and 16.6% ($n=64$) for female patients ($p < 0.001$). For atypical chest pain, the rate of ASA administration was 67.4% ($n=259$) for male patients and 6.1% ($n=24$) for female patients ($p=0.003$).

The study revealed distinct patterns in ASA administration by physicians based on chest pain characteristics and patient gender in an emergency department setting. For typical chest pain, ASA was administered to 42.8% of males and 50.5% of females, indicating a gender disparity favoring females in

this group, whereas rates dropped significantly for atypical pain (11% in males, 12.8% in females) with minimal gender differences. Clinical factors strongly influenced decisions: comorbidities increased ASA use (55.4% males, 58.5% females with typical pain), while suspicion of aortic dissection led to low administration (5.6% males, 7.2% females). Objective findings played a critical role, as ST-elevation MI-compatible ECGs ($>90\%$ ASA use) and ischemic ST-T changes (90.5% males, 87.2% females) correlated with high ASA administration. Troponin levels also guided decisions, with normal values reducing ASA use (74.4% males, 64.9% females) and levels $\geq 3x$ the reference range strongly predicting administration (97.2% males, 92.8% females). These findings underscore the interplay of symptom specificity, diagnostic biomarkers, and clinical caution in therapeutic decisions, with gender differences suggesting potential biases or adherence to sex-specific guidelines in typical presentations (Table 1).

The rates of ASA administration for a 50-year-old male patient presenting with atypical chest pain were statistically significantly different compared to those presenting with typical chest pain ($p < 0.001$). Similarly, significant differences were observed in the following scenarios: when comorbid diseases were present ($p < 0.001$), when there was a history of known aortic aneurysm ($p < 0.001$), when aortic dissection was suspected ($p=0.004$), when the ECG showed normal sinus rhythm ($p < 0.001$), when the ECG was consistent with ST-elevation myocardial infarction ($p=0.001$), when ischemic ST-T changes were present on the control ECG ($p < 0.001$), when there was no history of aneurysm and troponin levels were within the normal reference range ($p < 0.001$), and when there was no history of aneurysm and troponin levels were three times the upper limit of the normal reference range ($p < 0.001$). These differences were statistically significant between patients presenting with atypical chest pain and those presenting with typical chest pain (Table 2).

Physicians' preferences for administering ASA to a 50-year-old female versus male presenting with typical chest pain were significantly different ($p < 0.001$). Similarly, statistically significant differences were observed in the following scenarios: when the patient's ECG was consistent with ST elevation ($p=0.007$), when ischemic ST-T changes were present on the control ECG ($p=0.024$), when there was no history of aneurysm and troponin levels were within normal limits ($p < 0.001$), and when there was no history of aneurysm and troponin levels were within the normal reference range ($p < 0.001$). However, no statistically significant differences were found between the groups in the following cases: when comorbid diseases were present ($p=0.111$), when there was a history of known aortic aneurysm ($p=0.215$), when aortic dissection was suspected ($p=0.238$), and when the ECG showed normal sinus rhythm ($p=0.126$) (Table 3).

The preference for administering ASA to a 50-year-old patient with atypical chest pain did not show a statistically significant

difference based on whether the patient was male or female (p=0.311). Similarly, no statistically significant differences were observed in the following scenarios: when comorbid diseases were present (p=0.371), when there was a history of known aortic aneurysm (p=0.549), when aortic dissection was suspected (p=0.109), when the ECG showed normal sinus rhythm (p=0.324), when the ECG was consistent with ST-elevation myocardial infarction (p=0.678), when ischemic ST-T changes were detected on the control ECG (p=0.864), when there was no history of aneurysm and troponin levels were within the normal reference range (p=0.441), and when there was no history of aneurysm and troponin levels were more than three times the upper limit of the normal reference range (p=0.608). These factors did not significantly influence physicians' decisions to administer ASA (Table 4).

In this study, the treatments recommended by physicians for a 50-year-old female patient presenting to the emergency department with typical chest pain were evaluated in terms of demographic characteristics and working conditions. In the analysis involving 390 physicians, the tendencies to administer ASA (aspirin), along with decisions regarding the presence of comorbid diseases, history of aortic aneurysm, ECG findings, and troponin results, were examined. Among the physicians, 50.5% (n=197) administered ASA, while 49.5% (n=193) tended not to. ASA administration rates showed no significant association with physician gender (p=0.158), age group

(p=0.942), or duration of work in the emergency department (p=0.599). However, based on professional titles, 52.7% of assistant physicians administered ASA, compared to 33.3% among general practitioners (p=0.077). In cases with suspicion of aortic dissection, 20.5% of general practitioners reported this suspicion, while the rate was 4.7% among specialist-academics (p=0.003). For ECG: NSR (Normal Sinus Rhythm) findings, 69.3% of physicians aged 25-40 confirmed NSR, compared to 51.1% in the >40 age group (p=0.023). When troponin levels were within the normal range, 68.1% of physicians in departments with <1000 daily patient admissions considered this result, while the rate dropped to 47.5% in departments with >2000 admissions (p=0.041). ECG findings consistent with ST-elevation MI were recognized by 94.6% of physicians with <5 years of emergency department experience, compared to 86.3% among those with 5-10 years and 91.9% among those with >10 years of experience (p=0.046). In cases where troponin levels were three times the upper reference limit, 96.6% of female physicians prioritized this finding, versus 90.5% of male physicians (p=0.041). These findings highlight that physicians' treatment decisions are influenced by professional titles, years of experience, and patient load in their departments. Statistically significant differences were observed among physician groups in critical parameters such as suspicion of aortic dissection and interpretation of troponin levels, underscoring the need for standardized emergency protocols and targeted training programs (Table 5).

Table 1. Rates of ASA administration by physicians based on chest pain characteristics (typical or atypical) and patient gender (male or female) in patients presenting to the emergency department

		Typical		A-typical	
		Male	Woman	Male	Woman
Would you give the patient ASA?	Yes	167 (42.8)	197 (50.5)	43 (11)	50 (12.8)
	No	223 (57.2)	193 (49.5)	347 (89)	340 (87.2)
It is accompanied by comorbid disease	Yes	216 (55.4)	228 (58.5)	74 (19)	81 (20.8)
	No	174 (44.6)	162 (41.5)	315 (81)	309 (79.2)
There is a known history of aortic aneurysm	Yes	52 (13.3)	60 (15.4)	18 (4.6)	21 (5.4)
	No	338 (86.7)	330 (84.6)	372 (95.4)	369 (94.6)
You suspect aortic dissection	Yes	22 (5.6)	28 (7.2)	9 (2.3)	15 (3.8)
	No	368 (94.4)	362 (92.8)	381 (97.7)	375 (96.2)
ECG: NSR	Yes	251 (64.4)	262 (67.2)	74 (19)	81 (20.8)
	No	139 (35.6)	128 (32.8)	316 (81)	309 (79.2)
ECG: Compatible with ST elevation MI	Yes	369 (94.6)	358 (91.8)	355 (91)	352 (90.3)
	No	21 (5.4)	32 (8.2)	35 (9)	38 (9.7)
Ischemic ST-T change was detected in the control ECG	Yes	353 (90.5)	340 (87.2)	310 (79.5)	312 (80)
	No	37 (9.5)	50 (12.8)	80 (20.5)	78 (20)
Troponin value came within the normal reference range	Yes	290 (74.4)	253 (64.9)	89 (22.8)	83 (21.3)
	No	100 (25.6)	137 (35.1)	301 (77.2)	307 (78.7)
Troponin was 3 times higher than the normal reference range	Yes	379 (97.2)	362 (92.8)	343 (87.9)	339 (86.9)
	No	11 (2.8)	28 (7.2)	47 (12.1)	51 (13.1)

Descriptive statistics were presented as numbers (%); ASA: acetylsalicylic acid, NSR: normal sinus rhythm, ECG: electrocardiogram, MI: myocardial infarction

Table 2. Comparison of physicians' preferences for administering ASA to a 50-year-old male patient based on whether the chest pain is typical or atypical

		50 years old, male patient, typical chest pain		p
		Yes	No	
50 years old, male patient, applied with A-typical chest pain				
Would you give the patient ASA?	Yes	39 (23.4)	4 (1.8)	<0.001
	No	128 (76.6)	219 (98.2)	
It is accompanied by comorbid disease	Yes	65 (30.2)	9 (5.2)	<0.001
	No	150 (69.8)	165 (94.8)	
There is a known history of aortic aneurysm	Yes	12 (23.1)	6 (1.8)	<0.001
	No	40 (76.9)	332 (98.2)	
You suspect aortic dissection	Yes	6 (27.3)	3 (0.8)	<0.001
	No	16 (72.7)	365 (99.2)	
ECG: NSR	Yes	70 (27.9)	4 (2.9)	<0.001
	No	181 (72.1)	135 (97.1)	
ECG: Compatible with ST elevation MI	Yes	353 (95.7)	2 (9.5)	<0.001
	No	16 (4.3)	19 (90.5)	
Ischemic ST-T change was detected in the control ECG	Yes	303 (85.8)	7 (18.9)	<0.001
	No	50 (14.2)	30 (81.1)	
Troponin came within the normal reference range	Yes	86 (29.7)	3 (3)	<0.001
	No	204 (70.3)	97 (97)	
Troponin was 3 times higher than the normal reference range	Yes	340 (89.7)	3 (27.3)	<0.001
	No	39 (10.3)	8 (72.7)	

Descriptive statistics were presented as numbers (%); The McNemar-Bowker test was used for analysis; ASA: acetylsalicylic acid, NSR: normal sinus rhythm, ECG: electrocardiogram, MI: myocardial infarction

Table 3. Comparison of physicians' preferences for administering ASA to a 50-year-old patient with typical chest pain based on patient gender (female or male)

		50 years old, male patient, typical chest pain		p
		Yes	No	
50 years old, female patient, applied with typical chest pain				
Would you give the patient ASA?	Yes	160 (95.8)	37 (16.6)	<0.001
	No	7 (4.2)	186 (83.4)	
It is accompanied by comorbid disease	Yes	198 (91.7)	30 (17.2)	0.111
	No	18 (8.3)	144 (82.8)	
There is a known history of aortic aneurysm	Yes	40 (76.9)	20 (5.9)	0.215
	No	12 (23.1)	318 (94.1)	
You suspect aortic dissection	Yes	16 (72.7)	12 (3.3)	0.238
	No	6 (27.3)	356 (96.7)	
ECG: NSR	Yes	235 (93.6)	27 (19.4)	0.126
	No	16 (6.4)	112 (80.6)	
ECG: Compatible with ST elevation MI	Yes	356 (96.5)	2 (9.5)	0.007
	No	13 (3.5)	19 (90.5)	
Ischemic ST-T change was detected in the control ECG	Yes	332 (94.1)	8 (21.6)	0.024
	No	21 (5.9)	29 (78.4)	
Troponin came within the normal reference range	Yes	241 (83.1)	12 (12)	<0.001
	No	49 (16.9)	88 (88)	
Troponin was 3 times higher than the normal reference range	Yes	359 (94.7)	3 (27.3)	<0.001
	No	20 (5.3)	8 (72.7)	

Descriptive statistics were presented as numbers (%); The McNemar-Bowker test was used for analysis; ASA: acetylsalicylic acid, NSR: normal sinus rhythm, ECG: electrocardiogram, MI: myocardial infarction

Table 4. Comparison of physicians' preferences for administering ASA to a 50-year-old patient with atypical chest pain based on patient gender (female or male)

		50 years old, male patient, A-typical chest pain		p
		Yes	No	
50 years old, female patient, A- She applied with the complaint of typical chest pain				
Would you give the patient ASA?	Yes	29 (67.4)	21 (6.1)	0.311
	No	14 (32.6)	326 (93.9)	
It is accompanied by comorbid disease	Yes	55 (74.3)	26 (8.3)	0.371
	No	19 (25.7)	289 (91.7)	
There is a known history of aortic aneurysm	Yes	14 (77.8)	7 (1.9)	0.549
	No	4 (22.2)	365 (98.1)	
You suspect aortic dissection	Yes	7 (77.8)	8 (2.1)	0.109
	No	2 (22.2)	373 (97.9)	
ECG: NSR	Yes	59 (79.7)	22 (7)	0.324
	No	15 (20.3)	294 (93)	
ECG: Compatible with ST elevation MI	Yes	342 (96.3)	10 (28.6)	0.678
	No	13 (3.7)	25 (71.4)	
Ischemic ST-T change was detected in the control ECG	Yes	294 (94.8)	18 (22.5)	0.864
	No	16 (5.2)	62 (77.5)	
Troponin came within the normal reference range	Yes	65 (73)	18 (6)	0.441
	No	24 (27)	283 (94)	
Troponin was 3 times higher than the normal reference range	Yes	324 (94.5)	15 (31.9)	0.608
	No	19 (5.5)	32 (68.1)	
Descriptive statistics were presented as numbers (%); The McNemar-Bowker test was used for analysis; ASA: acetylsalicylic acid, NSR: normal sinus rhythm, ECG: electrocardiogram, MI: myocardial infarction				

Table 5. TIMI risk score (44)

Risk factor	Points	
Age>65	0	1
Risk factors of at least 3 CAD	0	1
Known CAD (at least 50% stenosis of the coronary artery)	0	1
ASA use in the last 7 days	0	1
At least 2 severe angina attacks in the last 24 hours	0	1
Cardiac marker positivity	0	1
ST segment deviation (at least 0.5 mm)	0	1
Sum	0-7	
TIMI: thrombolysis in myocardial infarction, CAD: coronary artery disease, ASA: acetylsalicylic acid		

The Effect of Physician Gender and Experience

Male physicians administered ASA 3.2 times more frequently to male patients with atypical chest pain compared to female physicians (OR: 3.2; 95% CI: 1.8-5.6). Physicians with more than 10 years of experience increased the use of ASA in patients with comorbidities by 1.8 times (p=0.02).

Discussion

Since there is no similar study in the literature, the findings of this study offer a new perspective to the literature, as there is no one-to-one similar study in the single-sample design planned to examine the factors affecting the behavioral attitudes of

emergency physicians regarding administering acetylsalicylic acid to patients presenting with chest pain. This study examined factors influencing emergency physicians' decisions to administer ASA to patients presenting with chest pain, detailing how physician- and patient-related parameters shape treatment practices. Physician-related factors such as age, gender, years of experience, professional title, and institutional workload were observed to influence ASA prescription behavior. Patient-based factors included gender, pain characteristics, comorbidities, history of aortic aneurysm, ECG findings, and troponin levels. These findings highlight the multidimensional nature of clinical decision-making in emergency departments (EDs) and underscore the need to complement standardized protocols with personalized approaches.

The Impact of Gender and Clinical Factors on ASA Decision

The findings highlight critical patterns in ASA administration, aligning with established guidelines while revealing nuances in clinical decision-making. The higher ASA use in typical chest pain cases underscores the role of symptom specificity in guiding therapy. Notably, the gender disparity in typical pain (favoring females) may reflect awareness of sex-specific presentations of coronary disease or biases in risk perception, warranting further investigation. The strong association between ECG abnormalities (ST elevation, ischemic changes) and ASA use emphasizes the reliance on objective diagnostic tools. Similarly, elevated troponin levels drove ASA administration, reinforcing

the importance of biomarkers in acute coronary syndrome management. Conversely, low ASA rates in aortic dissection suspicion align with contraindication protocols, demonstrating adherence to safety guidelines.

Physician Gender as a Factor

While overall ASA administration rates were similar between male and female physicians, gender-based differences emerged in specific scenarios. For instance, male physicians were more likely to administer ASA to male patients with atypical chest pain and normal troponin levels. Conversely, female physicians exhibited higher ASA prescription rates for female patients with typical chest pain and elevated troponin levels. These results align with Nakayama et al.'s (2012–2018) findings, which emphasized that female physicians demonstrate greater adherence to patient-centered care and clinical guidelines, positively impacting morbidity and mortality rates [5]. Similarly, Yusuke T. et al. reported lower readmission rates among patients treated by female internists, reflecting differences in communication and clinical decision-making [6]. These findings reiterate the importance of integrating communication skills and patient-centered approaches into medical training.

Physician Experience and Expertise

Physicians' years of ED experience and specialization level significantly influenced ASA administration decisions. Less experienced physicians prescribed ASA more frequently in STEMI cases but were less likely to do so in non-STEMI (NSTEMI) scenarios, suggesting heightened caution in high-risk situations. This mirrors Sakhnini et al. (2018), where inexperienced physicians interpreted cardiac risk scores more aggressively, influencing hospitalization decisions. Additionally, resident physicians were more inclined to administer ASA in atypical chest pain cases mimicking STEMI, while specialists adhered more strictly to guidelines in complex cases. John Z. et al. [7] further corroborated this, demonstrating that cardiologists exhibit superior guideline compliance compared to other specialties.

Hospital Workload and Resource Availability

Physicians in low-volume EDs administered ASA more frequently to patients with comorbidities or atypical symptoms, potentially due to greater time per patient. However, this contrasts with Micheal J. et al. [8], who reported higher rates of missed MI diagnoses in high-volume centers. This discrepancy may stem from differences in workload metrics (daily vs. annual). Jesse M. et al. [9] observed treatment delays in busy EDs but no significant differences in ASA administration times, suggesting prioritization of ASA regardless of workload. Technical infrastructure, cardiology consultation availability, and diagnostic turnaround times—unaddressed in this study—limit the generalizability of these findings.

Gender-Based Treatment Disparities

Female patients received ASA less frequently than males, even with typical symptoms or objective findings (e.g., elevated troponin, ischemic ECG). Zachary F. et al. [10] reported similar disparities in prehospital ASA use, while Yongchen et al. [11] highlighted reduced access to antiplatelet therapies and reperfusion strategies in women, correlating with higher in-hospital mortality. These findings align with literature on underdiagnosis and undertreatment of cardiac pathology in women. Subconscious biases, the tendency to label women's pain as "atypical," and societal gender roles may contribute to these disparities. Integrating gender equity and awareness modules into clinical training is strongly recommended.

Study Limitations and Future Directions

The primary limitation is the reliance on questionnaire-based data, which may not fully reflect real-time clinical decisions. Exclusion of hospital infrastructure, diagnostic timelines, and consultation availability further limits generalizability. Future studies should incorporate detailed scenarios accounting for patient age, pain duration, comorbidities, and pre-ASA medication history. Multicenter, longitudinal research could elucidate the origins of gender- and experience-based disparities.

Conclusion

This study is among the first in Türkiye to examine emergency physicians' ASA administration practices. It highlights the multidimensional factors influencing ASA prescription decisions, including physician gender, experience, and working conditions, as well as patient gender and symptom characteristics. These findings underscore the need for personalized treatment protocols. The systemic underadministration of ASA to female patients calls for greater efforts toward gender equity in the medical community. Clearer guidelines rejecting gender-based biases and updated physician training programs aligned with this approach will elevate treatment standards. Multidisciplinary strategies and continuous education programs are essential to optimize patient-physician interactions.

The results indicate that physicians are less likely to administer ASA to female patients compared to males. However, as physicians gain experience and advance in their specialization, their adherence to guideline-compliant treatment increases. These findings emphasize the importance of specialization and continuous medical education in clinical training.

Future studies should include a broader participant pool and physicians from diverse specialties. Additionally, evaluating other factors influencing ASA administration decisions (such as hospital conditions and diagnostic processes) could yield more comprehensive insights in this field.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

This cross-sectional study was conducted nationwide in Türkiye between November 26, 2020, and July 13, 2021, with approval from the Ethics Committee of İstanbul Prof. Dr. Cemil Taşçıoğlu City Hospital (Decision No: 221, Date: 16/06/2020). The study included 351 emergency medicine specialists and 39 general practitioners actively working in emergency departments.

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