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Clients' Satisfaction with Services Provided by Ambulances and Motor Ambulances of Tehran Emergency Medical Services: A Cross-sectional Study

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Abstract

Background: To improve the quality of services provided by emergency medical services (EMS), a correct understanding of the current situation and analysis of possible problems is required. The purpose of this study was to investigate the level of clients' satisfaction regarding the missions performed by ambulances and motor ambulances (motorlances) of the Tehran EMS center, and also identify the factors affecting their satisfaction.

Methods: This cross-sectional study was conducted for 1 month in Tehran, Iran. All clients in the age range of 18 to 87 years who were approached by Tehran EMS motorlances or ambulances were eligible. Those with wrong registered phone numbers, uninformed callers (passers, coworkers), and those who were not willing to participate in the study were excluded. A valid and reliable researcher-made questionnaire was used to assess the clients' satisfaction. Missions were surveyed routinely, 1 to 2 days following their performance. The questionnaires were filled out by the investigators via a telephone call to the patients or the patients' siblings. The collected data were statistically analyzed using IBM SPSS Statistics 24.0. An independent t test and 1-way analysis of variance were used to compare the mean satisfaction score between the groups. Other tests, such as the Pearson correlation coefficient, were also used to examine the relationship between quantitative variables. $P<0.05$ were considered statistically significant.

Results: In total, the data of 1100 missions were analyzed. The age range of the patients was between 1 and 100 years and their mean age was 52.1 ± 19.2 years, and the mean age of interviewees was 44.4 ± 13.4 years (18-87 years); of all the interviewees, 610 (55.5%) were women. The overall satisfaction of people with the Tehran EMS was rated as "very satisfied" in 78.5% of the cases; However, 11.2% of the participants had moderate and low satisfaction. We found that overall satisfaction was related to dependence on the health group ($p\leq0.001$), educational status ($p=0.006$), economic status ($p=0.002$), sent vehicle ($p=0.040$), and diagnosis ($p<0.001$).

Conclusion: Almost 80% of the participants were highly satisfied with the services provided by Tehran EMS motorlances/ambulances, according to this study. Those with a higher educational level, higher socioeconomic class, accurate diagnosis, proper sent car, and health dependency showed a higher level of happiness than the others.

Keywords: Ambulances, Patient Satisfaction, Emergency Medical Service Communication Systems, Emergency Medical Services

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↑What is "already known" in this topic:
Satisfaction regarding the services provided by Emergency Medical Services (EMS) has been considered in previous studies from various countries. It seems that satisfaction rate could be affected by many factors—such as age, sex, socioeconomic status, physical and mental condition, literacy, quality of used equipment, patient outcome, and so many other factors. However, the results were different in various societies.

→What this article adds:
We considered that conducting such research was vital in our society. As a result, we attempted to measure the overall satisfaction level of Tehran EMS clients on a big scale, as well as determine what aspects may influence it.

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Introduction

Satisfaction is a state of happiness or contentment with an act, event, or service, particularly on e that was previously desired. Regarding the clients, satisfaction is the level of happiness that they experience having used a service. It consequently reflects the gap between the expected service and the experience of the service, from the client's side. Also, patient satisfaction is the patient's perception of care received compared with the care expected (1).

Emergency medical services (EMS) is an important part of the health care delivery system worldwide. EMS provides a set of emergency care to patients, including some treatment and/or transferring them to the hospitals (2). Indeed, EMS clients' satisfaction is one of the important indicators of the quality of the whole health care system (3, 4). To improve the quality of these services, a correct understanding of the current situation and analysis of possible problems is always required (5, 6). Considering that the main philosophy and task of patient management is to satisfy public needs, all people can therefore be regarded as clients of his public organizations (7). Because patient satisfaction is seen as a healthcare outcome and predictor of treatment adherence and adherence to care and support, assessing patient satisfaction is critical. Furthermore, understanding the demands of patients is critical to achieving the sustainable development goal of health service transportation (1).

Satisfaction may be affected by many factors—such as socioeconomic status, physical and mental condition, literacy, quality of medical care, patient recovery, et cetera (8-10). Some studies have identified age as a characteristic of the patient that consistently influences satisfaction scores, and age will be positively correlated with satisfaction scores in previous studies, while older patients have higher satisfaction scores (8, 9, 11, 12). Some studies have found that previous experience with ambulance use is another factor influencing satisfaction, whereby patients who have previously used the service were more satisfied (13, 14). Interpersonal practices, such as concern, friendliness, courtesy, and respect, were also found to be a factor in patient satisfaction. Understanding the dimensions reflected in overall satisfaction improves the interpretation and consequences of these actions (15).

Each country will more than likely need to examine its EMS system regularly in this regard and make acceptable and achievable improvements accordingly (16). The goal of this study was to find out how satisfied clients were with the missions performed by Tehran EMS center's ambulances and motor ambulances/motorlances, as well as the factors that influenced their satisfaction, so that we could plan the strategies needed to develop and improve the care provided.

Methods

Study Design

This cross-sectional study was conducted from November 21 until December 20, 2020 in Tehran, Iran. The required permissions for conducting this study were received from Tehran EMS center and the ethical committee of Tehran University of Medical Sciences (code: IR.TUMS.SINAHOSPITAL.REC.1400.043). All data were recorded, analyzed, and presented anonymously.

Participants

All participants (interviewees) over 18 years who were approached by Tehran EMS motorlances and/or ambulances were eligible and a computer-generated table was used to randomize the participants. Those with the wrong registered phone numbers, uninform callers (passers, coworkers), and those who were not willing to participate in the study were excluded. About 858 persons were classified as non-responders, meaning they didn't answer our call at all, disputed their call and mission, or refused to engage in our research and hung up. If possible, the patients were questioned, but if that was not possible, the caller was. The minimum sample size required for this study was determined at 1000 participants based on existing estimates and assuming a total satisfaction of 40% in previous studies, with a 3% error for assessing satisfaction. The sample was chosen so that motorlance missions accounted for 30% of the entire sample size and ambulance missions accounted for 70%.

Questionnaire Preparation

A comprehensive literature review was performed by the investigators and related studies were reviewed. Consequently, a pool of questions was gathered and after eliminating duplicate and similar questions, the remaining questions were classified into different areas. To check the content validity of the prepared questionnaire, it was presented to 15 experts to grade each question in terms of transparency and necessity, as well as the comprehensiveness of the questionnaire. Then, content validity analysis was performed based on content validity ratio (CVR) and content validity index indicators and the final questionnaire was prepared (Appendix 1). Also, the internal reliability was assessed with Cronbach's alpha. The reliability of the 3 general sections of the questionnaire (technical quality, interpersonal aspects, and availability) was 0.865. Furthermore, the dependability of transfer satisfaction and satisfaction in the absence of a transfer section was 0.734 and 0.792, respectively. In addition, demographic and basic information of the participants (such as gender, job status, economic status, educational level, age, marital status, ethnicity) were recorded. Marital status was divided as single or married, and no one expressed their status as divorced. Being related to healthcare is defined as be-

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ing a familial relative with healthcare staff in the first or second degree relatives. In terms of socioeconomic status, we asked participants to analyze and compare their economic condition in the current economic scenario with their income and salary, and to rank their status on a scale of 1 to 5, with 1 being the lowest and 5 being the most. Furthermore, other variables that may affect the level of satisfaction were also evaluated. These variables include history of previously using EMS, mission time, place of mission, being health care system personnel, patient's level of consciousness at the time of call, insurance coverage, relationship of interviewee with the patient, reason for the call/emergency case, and area of residence. The patient's name and family name, age and sex of, mission address, phone number, type of sent vehicle, conscious status, diagnosis of a disease, and mission shifts were extracted from the EMS registry system and the age and sex of interviewee, history of the last 6 months use of EMS, related to health care staff, employment status, ethnicity, educational status and insurance coverage were asked from the interviewee.

Data Collection

Missions were surveyed routinely, 1 to 2 days after their performance, and included motorlance and ambulance missions (transfer and nontransfer). We called the number that was recorded in the EMS registry system as a caller, our priority was to ask the patient and, if that was not possible, or anyone who had information about the patients, whether any extra explanatory information was needed.

Statistical Analysis

Statistics such as frequency (percentage) and mean (standard deviation) were used to describe the data. To provide the total satisfaction score for the whole questionnaire, the sum of the scores of the domains was considered. An independent t test and one-way analysis of variance were used to compare the mean satisfaction score between the groups. Other tests such as the Pearson correlation coefficient were also used to examine the relationship between quantitative variables. $P < 0.05$ were considered statistically significant. The collected data were statistically analyzed using IBM SPSS Statistics 24.0.

Results

We called a total of 1968 persons, 758 of whom did not answer the phone, 110 of whom were hesitant to participate, and 10 of whom were deceased. Finally, the data from 1100 missions executed by the Tehran EMS center were evaluated. The age range of the study patients was between 1 and 100 years and their mean age was 52.1 ± 19.2 years. The baseline information of the study participants is presented in Table 1.

Based on the findings, the most common place of missions was home (1027 cases [93.5%]), and high school diploma was the most frequent educational degree (428 cases [39.2%]), participants with a moderate level of socioeconomic status had the highest rate (585 cases [53.8%]), and the most common time for the missions was the nighttime (628 cases [57.1%]).

Table 1. Baseline information of the study participants

Variable	Number	Percentage
Gender		
Female	610	55.5
Male	490	44.5
Interviewee		
Patient him/herself	206	18.7
Relatives	798	72.5
Others	89	8.1
Level of patient's consciousness		
Conscious	971	88.5
Semi- conscious	99	9.0
Unconscious	27	2.5
Insurance coverage		
Yes	912	83.4
No	182	16.6
Mission place		
Public	71	6.5
Home	1027	93.5
Marital status		
Single	224	22.2
Married	853	77.8
Educational status		
Illiterate	42	3.8
Some education	190	17.4
High school diploma	428	39.2
Associate degree	112	10.3
Bachelors' degree	217	19.9
Higher	102	9.3
Job status		
Employed	516	47.2
Housewife	412	37.7
Student	47	3.4
Unemployed	119	10.9
Ethnicity		
Fars	808	74.1
Non-Fars	283	25.9
Relation to healthcare workers		
Related	178	16.4
Unrelated	908	83.6
Socio-economic level		
High	119	10.9
Moderate	585	53.8
Low	384	35.2
Frequency of using EMS services in the last 6 months		
Once	84	25.5
Twice	97	29.5
3 or 4 times	52	15.8
More than four times	41	12.5
Not known	55	16.7
Frequency distribution of the technician's initial diagnosis		
Cardiovascular	317	28.9
Neurologic	207	18.9
Respiratory	111	10.1
Other	465	42.1
Mission time		
Morning	217	19.7
Evening	255	23.2
Night	628	57.1

Details of the participants' responses are presented in Table 2. Based on the findings, overall, the participants were "very satisfied" with Tehran EMS in 863 (78.5%) cases. In the 5 fields of satisfaction that were evaluated, the highest satisfaction rate was in the field of "interpersonal aspect," and the lowest was in the "nontransferred patients" field. The majority of responses indicate "extremely" high satisfaction, but in some areas—such as "What is your/the patient's rate of satisfaction with the

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Table 2. Details of the participants' replies in terms of satisfaction regarding services provided by Tehran emergency medical services (EMS)

Question	Level of satisfaction					Mean±SD
	Very little	Little	Average	Much	Very much	
	Number (%)					
How satisfied is the patient with the emergency services?	21 (1.9)	16 (1.5)	86 (7.8)	114 (10.4)	863 (78.5)	4.62(0.84)
Practical quality questions						
How accurate were the technicians in performing the services?	19 (1.7)	11 (1.0)	32 (2.9)	40 (3.6)	998 (90.7)	4.81±0.694
How much did the technicians know about your / patient's problem?	18 (1.6)	11(1.0)	34 (3.1)	25 (2.3)	1012 (92.0)	4.82±0.683
What is your / the patient's rate of satisfaction with the interventions and procedures performed in the pre-hospital stage for the patient?	26 (2.4)	17 (1.5)	55 (5.0)	77 (7.0)	925 (84.1)	4.69±0.831
Did the technicians have the necessary speed to perform the initial examination / procedures?	18 (1.6)	10 (0.9)	35 (3.2)	35 (3.2)	1002 (91.1)	4.81±0.684
Interpersonal relation questions						
Was the technician treating you / the patient respectfully and politely?	11 (1.0)	8 (0.7)	13 (1.2)	31 (2.8)	1037 (94.3)	4.89±0.537
Did the technicians look neat to you / the patient?	5 (0.5)	3 (0.3)	3 (0.3)	15 (1.4)	1074 (97.6)	4.95±0.346
In your opinion, was it possible to identify the technician (name and position) through clothing etiquette?	40 (3.6)	4 (0.4)	1 (0.1)	7 (0.6)	1048 (95.3)	4.84±0.773
Were the technicians committed to protecting your privacy / patient in providing medical care?	2 (0.2)	2 (0.2)	2 (0.2)	8 (0.7)	1086(98.7)	4.98±0.244
Did the technicians give you / the patient the necessary and sufficient explanation about the type of care and treatment?	20 (1.8)	21 (1.9)	40 (3.6)	54 (4.9)	964 (87.6)	4.79±1.700
Accessibility domain questions						
Was access to emergency services easy?	3 (0.3)	2 (0.2)	8 (0.7)	17 (1.5)	1070 (97.3)	4.95±0.320
Was the call duration appropriate?	3 (0.3)	3 (0.3)	12 (1.1)	19 (1.7)	1063 (96.6)	4.94±0.355
Was the waiting time for emergency relief appropriate?	16 (1.5)	22 (2.0)	41 (3.7)	60 (5.5)	961 (87.4)	4.75±0.745
Questions within the scope of transfer satisfaction						
Did the technicians observe all safety aspects for you / the patient during the transfer to the ambulance?	17 (6.0)	10 (3.6)	19 (6.8)	10 (3.6)	225 (80.1)	4.48±1.15
Did the technicians have the physical ability to perform the procedures including your / the patient's transfer?	9 (3.2)	1 (0.4)	4 (1.4)	19 (6.8)	247 (88.2)	4.76±0.786
Was the ambulance clean and tidy?	8 (2.9)	3 (1.1)	24 (8.7)	19 (6.9)	221 (80.4)	4.61±0.911
Was the speed of transfer to the hospital appropriate?	2 (0.7)	2 (0.7)	13 (4.7)	12 (4.4)	245 (89.4)	4.81±0.618
Was your / the patient's condition assessed regularly along the way?	25 (9.1)	3 (1.1)	16 (5.8)	8 (2.9)	222 (81.0)	4.48±1.24
Were the ambulance facilities and equipment appropriate for you / the patient?	8 (2.9)	7 (2.6)	33 (12.0)	29 (10.6)	197(71.9)	4.46±0.99
Was the destination hospital selected according to your / the patient's needs?	15 (5.5)	12 (4.4)	25 (9.1)	18 (6.6)	204 (74.5)	4.40±1.16
Satisfaction questions if not transferred						
Was the reason for not accepting the transfer offer to the hospital the inadequacy of the ambulance service?	786 (98.1)	3 (0.4)	1 (0.1)	5 (0.6)	6 (0.7)	4.95±0.427
Was the reason for not accepting the transfer proposal to the hospital the inadequacy of the proposed hospital?	580 (72.4)	3 (0.4)	2 (0.2)	3(0.4)	213 (26.6)	3.92±1.77
Was the reason for not accepting the offer of transfer to the hospital the fear of spreading the disease through the transfer of infection by ambulance?	527 (65.8)	2 (0.2)	7 (0.9)	6 (0.7)	259 (32.3)	3.66±1.87
Did the technicians give you / the patient adequate advice on what to do if you / the patient felt unwell again?	43 (5.4)	21 (2.6)	30 (3.7)	69 (8.6)	638 (79.7)	4.55±1.06
Did the technicians tell you / the patient about the danger signs?	46 (5.7)	20 (2.5)	26 (3.2)	64 (8.0)	645 (80.5)	4.55±1.07

interventions and procedures performed in the prehospital stage for the patient?" the satisfaction rate was less than 90%. Other questions asked from nontransferred patients included "Did the technicians provide you/the patient with the essential and appropriate information regarding the type of care and treatment in the field of practical quality? In interpersonal aspect, was the waiting time for emergency relief appropriate? In accessibility field, was the reason for not accepting the offer of transfer to the hospital the fear of spreading the disease through the transfer of infection by ambulance?" And "was the reason for not accepting the transfer proposal to the hospital the inadequacy of the proposed hospital?" Table 3 demonstrates the mean rates of patients' satisfaction with EMS in various assessed variables.

We found that overall satisfaction was related to dependence on the health group, educational status, economic status, sent vehicle, and diagnosis so that based on the findings, gender and marital status of the participants did not significantly affect overall and in-domain satisfaction rates. Being related to health care workers made significant differences in overall satisfaction. The mean score of overall satisfaction in illiterate people was significantly lower. The overall satisfaction in economic level was a

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Table 3. Comparison of the mean of satisfaction score of participants with Tehran emergency services based on baseline and demographic variables

Variable	Satisfaction, mean (SD)								
	Overall satisfaction	Practical satisfaction	Interpersonal relations satisfaction	Access Satisfaction	Total satisfaction 3 general areas	Satisfaction with the transfer	Satisfaction if no transfer	Total satisfaction in transferred patients	Total satisfaction in non-transferred patients
Gender									
Male	4.60(0.87)	19.10(2.75)	24.43(1.91)	14.61(1.07)	58.14(4.66)	31.84(4.65)	21.66(3.61)	89.33(9.41)	80.02(6.61)
Female	4.64(0.82)	19.15(2.65)	24.46(2.78)	14.68(1.03)	58.29(4.91)	32.08(4.06)	21.60(3.33)	90.46(8.07)	79.90(6.64)
P-value	0.480	0.764	0.847	0.258	0.607	0.644	0.810	0.289	0.790
Marital Status									
Single	4.59(0.84)	19.06(2.78)	24.59(3.89)	14.58(1.01)	58.23(6.01)	31.90(4.53)	21.62(3.30)	89.99(12.31)	79.85(6.23)
Married	4.63(0.84)	19.14(2.68)	24.40(1.81)	14.67(1.06)	58.21(4.41)	31.98(4.33)	21.62(3.48)	89.83(7.27)	79.98(6.72)
P-value	0.604	0.658	0.277	0.243	0.963	0.900	0.999	0.898	0.824
Related to health care workers									
Yes	4.42(1.04)	18.63(3.58)	24.14(2.86)	14.61(1.11)	57.38(6.62)	30.52(5.70)	21.45(3.40)	86.81(12.80)	79.26(8.16)
No	4.66(0.79)	19.22(2.49)	24.50(2.35)	14.66(1.01)	58.38(4.36)	32.28(3.98)	21.65(3.47)	90.57(7.63)	80.06(6.32)
P-Value	<0.001	0.008	0.072	0.540	0.011	0.015	0.563	0.010	0.214
Educational status									
Illiterate	4.55(1.17)	18.36(4.20)	24.67(1.07)	14.83(0.70)	57.86(4.89)	34.64(0.81)	21.45(3.37)	91.72(7.28)	79.58(6.65)
Diploma & lower	4.69(0.76)	19.31(2.48)	24.46(1.82)	14.65(1.12)	58.42(4.36)	32.04(4.20)	21.78(3.32)	90.15(7.23)	80.30(6.52)
University	4.52(0.90)	18.94(2.80)	24.40(3.19)	14.62(0.98)	57.96(5.38)	31.64(4.66)	21.42(3.63)	89.43(10.79)	79.47(6.80)
P-value	0.006	0.015	0.785	0.442	0.280	0.090	0.340	0.639	0.231
Employment status									
Employed	4.59(0.87)	18.98(2.94)	24.45(2.98)	14.61(1.10)	58.05(5.46)	32.23(4.30)	21.47(3.77)	90.42(9.74)	79.47(7.33)
Housewife	4.66(0.81)	19.23(2.47)	24.36(1.98)	14.69(1.04)	58.28(4.41)	31.90(4.23)	21.70(3.33)	89.58(7.48)	80.17(6.48)
Student	4.77(0.56)	19.55(1.65)	24.79(1.06)	14.42(1.23)	58.77(3.08)	32.90(2.96)	22.00(2.91)	90.20(7.84)	81.11(3.82)
Retired or unemployed	4.55(0.92)	19.24(2.70)	24.55(1.33)	14.72(0.74)	58.52(3.55)	30.45(5.36)	21.87(2.58)	88.00(8.20)	80.70(4.71)
P-value	0.257	0.309	0.646	0.293	0.618	0.213	0.622	0.580	0.218
Ethnicity									
Fars	4.62(0.84)	19.09(2.76)	24.43(1.78)	14.64(1.06)	58.16(4.45)	32.24(3.99)	21.64(3.43)	90.10(6.69)	79.91(6.78)
Non-Fars	4.63(0.85)	19.29(2.53)	24.51(3.71)	14.66(1.02)	58.43(5.68)	31.36(3.99)	21.59(3.48)	89.38(12.08)	80.20(5.92)
P-value	0.909	0.362	0.611	0.813	0.411	0.117	0.856	0.526	0.591
Economic status									
Low	4.65(0.83)	19.13(2.71)	24.48(1.67)	14.73(0.94)	58.34(4.32)	31.55(4.28)	21.89(3.24)	89.29(7.81)	80.47(6.13)
Moderate	4.66(0.80)	19.26(2.47)	24.49(2.88)	14.59(1.14)	58.34(4.98)	32.31(4.26)	21.72(3.40)	90.53(9.63)	80.13(6.41)
High	4.36(1.02)	18.52(3.53)	24.18(2.09)	14.67(0.91)	57.38(5.27)	32.33(4.75)	20.54(3.95)	89.70(7.81)	77.92(8.24)
P-value	0.002	0.023	0.450	0.117	0.118	0.363	0.004	0.534	0.005
Residential area									
Centre	4.67(0.72)	19.38(2.25)	24.59(1.26)	14.66(0.93)	58.64(3.55)	31.88(4.45)	21.50(3.54)	90.16(6.43)	80.21(6.16)
North	4.57(0.57)	18.90(3.44)	24.44(1.51)	14.72(0.92)	58.07(4.61)	33.20(2.52)	21.45(3.50)	89.87(6.65)	79.86(6.66)
East	4.66(0.77)	19.19(2.27)	24.45(1.74)	14.69(0.99)	58.33(3.99)	32.39(4.24)	21.79(3.27)	90.57(7.32)	80.17(6.12)
West	4.57(0.90)	19.05(2.82)	24.23(2.37)	14.60(1.14)	57.87(5.23)	31.45(4.78)	21.62(3.36)	88.71(10.77)	79.69(6.78)
South	4.60(0.91)	18.98(3.01)	24.52(4.43)	14.55(1.25)	58.06(6.68)	31.32(4.74)	21.63(3.74)	89.82(11.03)	79.58(7.93)
P-value	0.624	0.411	0.592	0.476	0.494	0.263	0.906	0.829	0.884
Respondent									
The patient	4.61(0.95)	18.78(3.43)	24.21(2.82)	14.78(0.92)	57.77(6.46)	30.25(5.15)	21.38(3.29)	87.43(11.59)	79.32(8.15)
Siblings	4.63(0.79)	19.22(2.38)	24.50(2.41)	14.63(1.05)	58.35(4.31)	31.93(4.33)	21.66(3.50)	90.02(8.40)	80.10(6.17)
Neighbor/ friend	4.74(0.66)	19.81(0.83)	24.79(0.90)	14.38(1.59)	58.98(2.37)	34.50(1.55)	21.96(3.37)	93.56(4.73)	81.04(4.17)
Other	4.43(1.14)	18.56(4.24)	24.30(1.74)	14.56(0.92)	57.41(5.52)	34.04(2.14)	22.00(3.15)	91.26(5.69)	78.85(8.80)
P-value	0.277	0.023	0.349	0.086	0.172	<0.001	0.723	0.064	0.397

statistically significant difference, which was the lowest satisfaction in high economic level and the highest rate in very high economic level. There was no statistically significant difference in the mean score with the sent device in other areas. The mean score of overall satisfaction was significantly higher when the technician's diagnosis was cardiac emergency and diabetes emergency compared with other diagnosis. The mean score of satisfaction with shift work was not significantly different in any of the areas of satisfaction (Table 4).

Discussion

In the present study, the general satisfaction of the participants with Tehran EMS was "very satisfied" in more than 75% of cases. Also, only about 11% of people had moderate and lower satisfaction, and in all areas, between 65% and 98% of the participants rated their satisfaction as "very satisfied." The highest level of satisfaction was related to technicians' commitment to protecting the patient's privacy on an interpersonal level, while the lowest level of satisfaction was related to the field of satisfaction in nontransferred patients, which asked, "Was the reason for not accepting the offer of transfer to the hospital the fear of disease transmission through ambulance transport?" In the present study, there was no significant correlation between the age of the clients with the overall

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Table 4. Comparison of the mean of satisfaction score of the participants with Tehran emergency services based on clinical and mission variables

Variable	Satisfaction, mean (SD)								
	Overall satisfaction	Practical satisfaction	Interpersonal relations satisfaction	Access Satisfaction	Total satisfaction 3 general areas	Satisfaction with the transfer	Satisfaction if no transfer	Total satisfaction in transferred patients	Total satisfaction in non-transferred patients
History of using emergency services in the last 6 months									
Yes	4.60(0.89)	19.17(2.70)	24.41(1.63)	14.60(1.09)	58.18(4.39)	32.01(4.38)	21.75(3.30)	90.14(7.22)	80.00(6.56)
No	4.63(0.83)	19.10(2.70)	24.45(2.71)	14.67(1.03)	58.23(4.99)	31.93(4.38)	21.57(3.52)	89.74(9.46)	79.92(6.68)
P-value	0.559	0.697	0.772	0,313	0.882	0.886	0.496	0.730	0.874
Mission area									
Public	4.46(0.94)	18.96(3.03)	24.20(1.97)	14.51(1.04)	57.66(4.24)	33.00(3.29)	21.91(3.84)	90.23(6.48)	79.86(6.63)
Private	4.63(0.83)	19.14(2.67)	24.46(2.46)	14.66(1.05)	58.26(4.84)	31.78(4.51)	21.61(3.43)	89.81(9.14)	79.95(6.63)
P-value	0.110	0.588	0.374	0.244	0.313	0.108	0.692	0.782	0.951
Sent vehicle									
Ambulance	4.59(0.88)	19.09(2.81)	24.43(2.70)	14.62(1.07)	58.15(5.04)	32.07(4.29)	21.50(3.69)	90.20(8.74)	79.66(7.05)
Motor	4.72(0.72)	19.26(2.46)	24.60(1.59)	14.74(1.00)	58.60(4.13)	-	21.81(2.99)	-	80.40(5.91)
Both	4.53(0.89)	18.87(2.34)	23.85(2.31)	14.53(0.95)	57.25(4.77)	31.44(4.81)	21.92(3.71)	88.22(9.11)	80.46(5.28)
P-value	0.040	0.498	0.089	0.190	0.108	0.543	0.429	0.387	0.301
Mission result									
Non-transferred	4.46(0.81)	19.16(2.69)	24.50(1.74)	14.66(1.06)	58.32(4.41)	-	-	-	-
Transferred	4.56(0.92)	19.04(2.70)	24.29(3.75)	14.61(1.01)	57.94(5.76)	-	-	-	-
P-Value	0.167	0.549	0.192	0.432	0.243	-	-	-	-
Level of consciousness									
Conscious	4.62(0.84)	19.14(2.67)	24.47(2.46)	14.66(1.01)	58.27(4.77)	31.85(4.48)	21.60(3.46)	89.76(9.08)	79.99(6.49)
Semi-conscious	4.54(0.92)	19.03(2.87)	24.15(2.29)	14.52(1.41)	57.71(5.15)	32.23(3.37)	21.48(3.37)	89.70(7.44)	79.27(7.62)
Non-conscious	4.78(0.80)	19.07(3.21)	24.52(1.60)	14.59(1.12)	58.18(4.80)	34.00(1.93)	22.80(3.03)	93.75(2.31)	80.33(8.47)
P-Value	0.376	0.929	0.451	0.455	0.540	0.369	0.392	0.450	0.679
Diagnosis									
Cardiac emergencies	4.74(0.66)	19.50(1.85)	24.92(1.52)	14.74(0.83)	58.86(3.23)	31.65(5.11)	3.79(1.82)	90.08(8.04)	80.83(5.34)
Neurologic	4.59(0.86)	19.20(2.54)	24.48(1.68)	14.71(0.96)	58.39(3.98)	32.35(4.08)	3.45(1.94)	91.23(5.45)	79.88(6.18)
Respiratory	4.64(0.81)	19.24(2.17)	24.64(1.20)	14.60(0.97)	58.49(3.50)	31.13(3.74)	3.62(1.89)	89.16(6.63)	80.14(5.16)
Infectious disease	4.38(1.11)	18.32(3.80)	24.22(6.78)	14.36(1.71)	56.91(9.71)	31.52(5.07)	4.04(1.70)	89.93(13.86)	77.20(11.61)
Diabetes emergencies	4.74(0.81)	19.29(2.90)	24.61(1.47)	14.58(0.52)	58.75(4.39)	33.50(3.21)	3.61(1.89)	91.17(5.71)	80.87(6.80)
Trauma & injuries	4.41(1.07)	18.45(3.71)	24.28(1.64)	14.54(1.25)	57.28(4.91)	33.02(3.28)	3.39(1.96)	90.67(6.09)	77.08(7.89)
Abdominal emergencies	4.40(1.08)	18.62(3.65)	24.09(1.95)	14.45(1.07)	57.17(5.45)	30.87(4.11)	3.81(1.83)	88.00(6.61)	77.53(9.42)
Other	4.74(0.71)	19.21(2.70)	24.18(2.49)	14.64(1.06)	58.03(5.62)	31.73(5.36)	3.76(1.86)	87.93(14.29)	80.74(5.38)
Non-specific	4.52(0.85)	18.77(2.85)	24.21(1.73)	14.46(1.41)	57.45(4.43)	33.00(2.76)	3.36(1.97)	87.83(7.33)	78.94(6.95)
P-Value	<0.001	0.005	0.567	0.040	0.009	0.529	0.455	0.814	<0.001
Work shift									
Morning	4.67(0.78)	19.14(2.78)	24.37(2.09)	14.71(1.07)	58.22(4.91)	32.96(3.08)	3.65(1.87)	91.98(3.91)	79.58(7.64)
Evening	4.63(0.86)	19.16(2.70)	24.62(3.58)	14.72(1.00)	58.50(5.35)	31.36(5.47)	3.68(1.88)	89.37(11.86)	80.43(5.81)
Night	4.60(0.86)	19.11(0.86)	24.40(1.90)	14.60(1.06)	58.11(4.52)	31.83(4.29)	3.66(1.87)	89.34(8.68)	79.89(6.54)
P-Value	0.561	0.972	0.423	0.179	0.556	0.132	0.983	0.143	0.465
Sent vehicle in not transferred									
Ambulance	4.60 (0.85)	19.11 (2.83)	24.44 (1.83)	14.62 (1.11)	58.17 (4.60)	-	21.50 (3.69)	-	79.66 (7.05)
Motorlance	4.72 (0.72)	19.26 (2.46)	24.60 (1.60)	14.74 (1.01)	58.59 (4.14)	-	21.82 (2.99)	-	80.40 (5.91)
Both	4.64 (0.81)	18.79 (2.55)	24.57 (1.16)	14.71 (0.61)	58.07 (3.32)	-	21.92 (3.71)	-	80.46 (5.29)
P-Value	0.050	0.651	0.472	0.313	0.413	-	0.429	-	0.301
Sent vehicle in transferred									
Ambulance	4.60 (0.85)	19.11 (2.83)	24.44 (1.83)	14.62 (1.11)	58.17 (4.60)	-	-	-	-
Both	4.36 (1.01)	18.79 (2.55)	24.57 (1.16)	14.71 (0.61)	58.07 (3.32)	-	-	-	-
P-Value	0.297	0.676	0.796	0.746	0.938	-	-	-	-

satisfaction; however, in some studies, age had a correlation with satisfaction score, and older patients had higher satisfaction (8, 12, 17, 18). In this study, being related to a healthcare worker had an effect on satisfaction in contrast

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to another study (19). The mean score of overall satisfaction in illiterate people was lower than those with higher educational levels, and this difference was statistically significant. Some other studies also showed the effect of education (20, 21). The mean score of satisfaction did not significantly differ based on residential area, history of using emergency services in the last 6 months, and location of urgency in any areas of satisfaction. Another study also reported the same result (19). Nonetheless, some studies have found that patients who have previously used the service are more satisfied (14, 22). The mean satisfaction score in missions where a motorlance was dispatched was higher than when a motorlance and ambulance were dispatched simultaneously, and there was a statistically significant difference, which could be due to the shorter time to reach the patient's bedside and the establishment of appropriate triage protocols to dispatch the proper vehicle, which was in line with the findings of another study (13).The mean score of satisfaction was not significantly different between various shifts (mission time) in any of the fields of satisfaction, which is consistent with some other studies (20, 23). Lower satisfaction (about 87%) was gained in the question" Was the waiting time appropriate for an ambulance to arrive?" In this study, we found that this factor is affected by traffic, bases, and personnel deficit, nonemergency missions, and lack of bases, et cetera, and similar findings were reported in some other studies (24-26), whereas the findings of another study contradicted it (27). In terms of transfer satisfaction in the present study, the question "Was your/the patient's condition assessed on a regular basis?" was the only case where more than 10% of people reported "very little" or no satisfaction in. Coronavirus disease 2019 pandemic may have had influence on the EMTs presence on the rear cabin. Another study found similar results (13, 28), but in another study, opposing results were shown (29). In the present study, in the area of satisfaction in case of nontransfer, about 98% of people did not consider the inadequacy of ambulance services as the reason for not transferring, and in response to the question "Was the reason for not accepting the offer to be transferred to the hospital the fear of spreading of infection through the transmission by ambulance?" About 32% of people chose "very much" as an answer, which indicates high dissatisfaction with this aspect. We can conclude from this that the vast majority of people trusted EMS and their methods of providing services and facilities. Furthermore, 26% of participants stated that the recommended hospital's deficiency was the reason for not being moved by emergency services. We recommend researching the impact of satisfaction survey findings on EMS services and comparing the results after and before the survey from the client's perspective.

Limitations

Patients who were dead and whose friends refused to be questioned, as well as patients or responders who refused to fill out the questionnaire, were excluded from this study. Also, several calls came from numbers that had nothing to do with the patient and had no information for us to fill out our questionnaire. Furthermore, those who were dissatisfied with the hospital and admission process had a negative impact on their satisfaction with EMS.

Conclusion

This study showed that the level of clients' satisfaction regarding services provided by Tehran EMS motorlances/ambulances was very satisfied in almost 80% of the interviewee. Those with a higher educational level, a better financial status, a more correct diagnosis, a proper sent vehicle, and a greater reliance on health care are more satisfied than the others.

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Ethics Committee Approval

The required permissions for conducting this study were received from Tehran Emergency Medical Services (EMS) center and the ethical committee of Tehran University of Medical Sciences (code: IR.TUMS.SINAHOSPITAL.REC.1400.043).

Conflict of Interests

The authors declare that they have no competing interests.

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Appendix 1. CVI and CVR of final Tehran emergency customer satisfaction questionnaire for ambulance & motor ambulance services

Item	Explain*	CVR	CVI
Public satisfaction	How satisfied is the patient with the emergency services?	1.0	1.0
Technical quality	How accurate were the technicians in performing the services?	0.87	1.00
	How much did the technicians know about your / the patient's problem?	0.60	0.87
	How satisfied are you / the patient with the pre-hospital interventions?	0.60	0.93
	Were the technicians fast enough to perform the necessary procedures / examinations?	0.73	0.93
Interpersonal aspects	Was the technician treating you / the patient respectfully?	1.00	1.00
	Did the technician look neat to you / the patient?	0.87	0.93
	In your opinion, was it possible to identify the technician's (name and position) from the clothing label?	0.73	0.87
	Were the technicians committed to protecting your / the patient's privacy in providing medical care?	0.87	0.93
	Did the technicians give you / the patient the necessary and sufficient explanation about the type of care and treatment?	0.87	0.93
Availability	Was access to emergency services easy?	0.87	0.86
	Was the call time appropriate?	0.87	0.86
	Was the waiting time for emergency service arrival appropriate?	0.87	0.86
Transfer satisfaction	Did the technicians observe all safety aspects for you / the patient during the transfer to the ambulance?	0.87	0.93
	Did the technicians have the physical ability to perform the procedures, including your / the patient's transfer?	0.73	0.79
	Was the ambulance clean and tidy?	1.00	0.93
	Was the speed of transfer to the hospital appropriate?	0.73	0.87
	Was patient's/your condition regularly assessed along the way?	0.73	0.93
	Were the facilities and equipment of the ambulance suitable for you or the patient?	0.60	0.86
	Was the destination hospital selected according to your / the patient's needs?	0.73	0.86
Satisfaction if no transfer	Was the reason for not accepting the transfer to the hospital the inadequacy of the ambulance service?	0.71	0.85
	Was the reason for not accepting the transfer to the hospital the inadequacy of the proposed hospital?	0.73	0.87
	Was the reason for not accepting the transfer to the hospital the fear of transferring the disease by ambulance?	0.73	0.87
	Did the technicians give you adequate advice on what to do if you or the patient felt unwell again?	0.73	0.80
	Did the technicians tell you the danger signs?	0.73	0.80

CVI: Content validity index, CVR: Content validity ratio

*. With 5-point Likert response from very much to very little

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