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RESEARCH ARTICLE

The Need for Emergency Case Management in Family Medicine: A Capital City Case

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Abstract

Introduction: The aim of this study is to evaluate 112 emergency ambulance calls made from primary healthcare institutions and to determine the reasons for patient referrals, the most frequent (pre)diagnoses they received according to age groups, and the frequency of encounters with these patients. Additionally, the study aims to identify which topics should carry more weight in family medicine specialty education and in-service training for individuals working in family health centers. **Methods:** Our study is a retrospective cross-sectional and descriptive study. Between November 2018 and November 2019, we retrospectively reviewed 112 emergency ambulance requests from family health centers in Ankara using the 112 command and control center archive records of the relevant patients. A total of 1829 calls were evaluated. Various parameters such as age, gender, vital signs, urban/rural case status, reason for the call, type of call termination, the ICD-10 diagnostic code, and ambulance type were analyzed. **Results:** Among the patients, 45.54% were female. The mean patient age was 47.31±24.62 years. The most frequent triage code assigned to patients was code yellow, accounting for 46.36% of cases. While 33.95% of patients were referred due to cardiovascular diseases, 12.52% for trauma, 7.22% for gastrointestinal diseases, and 6.62% for pulmonary diseases. Trauma and fever were more prominent in pediatric cases. Among diagnoses in the geriatric age group, vertigo was identified as one of the top five diagnoses. **Conclusion:** Medical reasons constituted the most common causes for 112 emergency ambulance requests, and the primary method of resolution by 112 teams was hospital transfer. Through this study, we identified the primary care physician's most frequent involvement in emergency case management and areas where they require assistance. A majority of the relevant cases were assigned code yellow, indicating that reinforcing family health centers could provide a solution to alleviate unnecessary patient overcrowding in emergency departments.

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Introduction

Family physicians constitute the first point of medical contact to the health system; provide an open and unrestricted access to those who wish to receive services; deal with all health problems regardless of age, gender or any other characteristic of the individual; and manage acute and chronic health problems of patients simultaneously.[1] Individuals apply to FHCs (Family Health Centers) at a time when their ailments have not yet been defined and differentiated. Family medicine specialists identify diseases with their unique problem-solving skills and perform important services in its management and coordination.[1] For this reason, rotations in the curriculum of family medicine specialty training are important.[2] During these rotations, trainees are taught when and how much intervention should be made in various diseases, how to detect emergency situations and when they should be referred. With this study, it is aimed to make important determinations about which subjects should be included more in the current curriculum in rotations of family medicine specialty education and in emergency situations. As a matter of fact, there is not a sufficient number of studies in the literature on the diseases for which patients are mostly referred from family health centers by 112 Emergency Ambulance service.

Based on this need, in our study, it was aimed to evaluate 112 emergency ambulance calls made from all Family Health Centers in Ankara, the capital of Turkiye, within a year and to determine the patients referred by 112 emergency ambulance as a result of these calls, the reasons for referral, the age groups in which the first interventions were made and how often they were referred due to which problems.

Material and Methods

Our study is a retrospective cross-sectional and descriptive study. We retrospectively screened 112 emergency ambulance requests (n:1829) from all family health centers (n:345) in Ankara between November 1, 2018 and November 1, 2019 from the archival records of the relevant patients on a case-by-case basis. Records before the Covid 19 pandemic period was chosen in the hopes to reflect more accurate social data.

Our study was based on calls made from all family health centers in the capital city within one year between the relevant dates and the records kept by the 112 Command and Control Center through the relevant teams of all patients who were evaluated, referred or intervened through 112 Emergency Health Services. All age groups were included in the study, and cases outside the province of Ankara and patients who did not receive 112 Emergency Ambulance Health Service were excluded from the study.

Data Collection Tools

Some parameters such as age, gender, vital signs (consciousness, pupils, respiration, skin, pulse), urban/rural case status, reason for the call, the way it was terminated, prediagnosis(es) received (ICD10 diagnostic and superdiagnostic codes and names), type of the ambulance sent were analyzed.

Statistical Analysis

Among the descriptive statistical data, continuous variables were expressed as mean ± standard deviation and discrete data were expressed as number and %. SPSS 23 package program was used in the evaluations.

Research Authorization

The relevant records were anonymized by numbering the patients without including personal records. Ethics committee approval was obtained from the local ethics committee, and research permission was obtained from the relevant institution.

Results

In this study, a total of 1829 calls made by family physicians working in primary health care organizations in Ankara province were evaluated. While 43.63% (n=798) were male and 45.54% (n=833) were female, 10.83% (n=198) of the patients who received 112 emergency ambulance calls did not have their gender specified in the records. Of the patients, 25.97% (n=475) were over the age of 65, 48.11% (n=880) were between the ages of 18-64, and 15.09% (n: 276) were under the age of 18. The age of 10.83% (n=198) of the patients was not recorded and the mean age of the patients was 47.31±24.62 (minimum: 1; maximum: 96).

When the locations of the family health centers where the calls were made were examined, it was seen that the most frequent application was from Keçiören district, which is located in the center of the capital city, with 15.58% (n=285) and the least application was from Güdül district, which is located in a rural area, with 0.05% (n=1).

Regarding the vehicles that responded to the calls, 98.57% (n=1803) were panel-type ambulances, followed by 0.87% (n=16) snow-tracked ambulances, 0.16% (n=3) intensive care ambulances or obese patient panel vans, 0.16% (n=3) pa-

nel vans with four stretchers and 0.05% (n=1) motorcycle ambulances. While 97% (n=1775) of all calls were command-approved, 3% (n=54) were from 112 Emergency Health Stations that can work integrated with family health centers without command approval. While 57.30% (n=1048) of the applications were within the 112 teams' own regions, 42.59% (n=779) were outside their own regions.

Table 1 shows the data that the reasons of the calls were recorded in general and not on a diagnostic basis. The most common reason for emergency calls was medical reasons (84.53%, n=1546), followed by "other accidents".

Table 1: Main reasons for 112 emergency ambulance request calls made by family physicians working in primary healthcare

	n	%
Medical	1546	84.53
Other accidents	165	9.02
Injuries	44	2.41
Traffic accident	30	1.64
Other	25	1.37
Suicide	6	0.32
Health Measures	6	0.32
Work accident	4	0.22
Fever	2	0.11
Total	1828	99.94
Cause unknown	1	0.06
Total	1829	100.00

Detailed information on how 112 emergency ambulance calls made by family physicians working in primary healthcare organizations were finalized by 112 teams is given in Table 2.

Table 2: The manner in which 112 emergency ambulance calls made by family physicians working in primary care are concluded by 112 units

	n	%
Transportation (to hospital)	1565	85.57
Mission cancellation	172	9.41
Transfer - Rejection	63	3.44
Transport by another vehicle	20	1.09
On-site intervention	5	0.27
Other	2	0.11
Ex (Left in place)	2	0.11
Total	1829	100.00

While the most common type of finalization was "transfer", it was also found that the reasons such as "need for intensive care, lack of free space, need for medical equipment, need for specialist physicians, patient request, need for advanced specialized physicians" were shown in the detailed information recorded.

When the classification of all cases for which 112 emergency ambulance calls were made by family physicians working in primary health care organizations according to ICD diagnosis type, it was seen that CVS (Cardio-Vascular System) diseases were the most common with 33.95% (n=621). The lowest number of cases was found to be electric shock with 0.11% (n=2). Table 3 shows the classification of cases according to ICD diagnosis types in detail.

Table 3: Classification of cases called for 112 emergency ambulance by family physicians working in primary health care according to ICD diagnosis types

	n	%
Cardiovascular system diseases	621	33.95
Trauma	229	12.52
Gastrointestinal system diseases	132	7.22
Respiratory System	121	6.62
Neurological	84	4.59
Poisoning	65	3.55
Vertigo	56	3.06
Psychiatric	46	2.52
Pain	37	2.02
Fever	35	1.91
General symptoms and other signs	34	1.86
Other	34	1.86
Metabolic disorders	32	1.76
Genitourinary system diseases	24	1.31
Headache	18	0.98
Obstetrics or pregnancy	18	0.98
Epistaxis	14	0.77
Allergic conditions	13	0.71
Infectious diseases	8	0.44
Battered	7	0.38
Electric shock	2	0.11
Total	1630	89.12
Unclassified	199	10.88
Total	1829	100.00

In addition, 46.36% (n=848) of the cases were given code yellow, while 4 cases were given code black by 112 teams. While 69.38% (n=1269) of the cases were found to be conscious, 0.71% (n=13) were found to be completely unconscious. The details of triage and vital status of the examined cases are given in Table 4.

Table 4: Some examination results of 112 Emergency Ambulance Calls by family physicians working in primary health care organizations

		n	%
Triage	Code Yellow	848	46.36
	Code Green	656	35.87
	Code Red	124	6.78
	Code Black	4	0.22
	Missing	197	10.77
	Total	1829	100.00
Consciousness	Open	1269	69.38
	Closed	13	0.71
	Confuse	5	0.27
	Blurred	6	0.33
	Missing	536	29.31
	Total	1829	100.00
Pupils	Normal	1195	65.34
	Isochoric	34	1.86
	No Reaction	7	0.38
	Myotic	3	0.16
	Fix Dilated	4	0.22
	Midriatik	1	0.05
	Anisochoric	2	0.11
	Missing	583	31.88
	Total	1829	100.00
Respiration	Regular	1201	65.66
	Irregular	27	1.48
	Dyspnea	26	1.42
	None	11	0.60
	Fast	2	0.11
	Missing	562	30.73
	Total	1829	100.00
Skin examination	Normal	1176	64.30
	Pale	29	1.59
	Sweaty	18	0.98
	Cyanotic	11	0.60
	Hyperemic	4	0.22
	Dry	2	0.11
	Missing	589	32.20
	Total	1829	100.00
Pulse	Regular	1198	65.50
	Arrhythmic	39	2.13
	None	13	0.71
	Filiform	4	0.22
	Missing	575	31.44
	Total	1829	100.00

*Code yellow: Unstable condition; Code green: Stable condition; Code red: Critical emergency; Code black: Death

In addition, ICD diagnosis types were also determined according to age groups and the first five diagnoses among the most frequently diagnosed diseases are summarized in Table 5. In addition, the listed practice competencies expected to be acquired by the specialist physician and other complementary "core competencies" acquired during his/her education as specified in the Core Curriculum of Family Medicine Residency Training of the Board of Medical Specialization Curriculum Formation and Standard Setting System (TUKMOS) were defined as four levels.[2] The distribution of the relevant diagnostic codes according to the levels specified in the explanations section of Table 5 is also given. Accordingly, while the most common diagnostic code in children was "Trauma", it was determined that "CVS diseases" were the most common diagnostic code in adult age groups, and the competency level of both diagnostic codes was determined as 3 (refers to the level of applying intervention in non-complex, common typical cases). Here, while the competency of "Soft Tissue Trauma" is expected to be possessed by the specialist physician with a competency level of 3, it was also determined that it is specified as 2 competency levels under the sub-competency title of "Initial Assessment and Stabilization of Trauma Patient" in the relevant curriculum.

Table 5: Distribution of ICD diagnoses by age groups (Top 5 most common diagnoses) and level of competency in specialty curricula

Age range	Diagnoses	n	%	Competency Level
65 years and older	CVS diseases*	247	52.00	3
	Respiratory system diseases	52	10.95	2,3
	Trauma	45	9.47	2,3
	GIS diseases*	24	5.05	3
	Vertigo	20	4.21	-
18-65 age range	CVS diseases	350	39.77	3
	Trauma	102	11.59	2,3
	GIS diseases	83	9.43	3
	Respiratory system diseases	45	5.11	2
	Neurological diseases	37	4.20	2
Under 18 years old	Trauma	81	29.35	2,3
	Neurological diseases	36	13.03	2
	GIS diseases	25	9.06	3
	Fever	24	8.70	3
	CVS diseases**	23	8.33	3
	Respiratory system diseases**	23	8.33	2,3

*CVS: Cardiovascular system, GIS: Gastrointestinal system
**Diagnoses in equal proportions are also shown
***Four levels are defined for speciality competencies:
1: It refers to the level of having knowledge about how the initiative is carried out and being able to make explanations when necessary.
2: Refers to the level of being able to perform this intervention in an emergency, under guidance or instruction, or under supervision and control.
3: It refers to the level of being able to apply the intervention in uncomplicated, common, typical cases.
4: Refers to the level of ability to perform interventions in all types of cases, whether complex or not.

Discussion

With our study, we determined the reasons for referral of patients who were referred through 112 Emergency Health Services from all Family Health Centers providing primary health care services in a capital city within a year, the age groups for which problems they were referred, the frequency of acute problems encountered, and the issues that they had difficulty in managing alone in terms of diagnosis, treatment or follow-up in primary care.

In our study, when we looked at the main reasons for getting calls, medical reasons were 84.53%, other accidents (other than traffic accidents) were 9.02%, and traffic accidents were 1.64%. In a thesis study, 112 diagnoses were evaluated and it was observed that the first rank was medical problems with 59.5%, the second rank was falls and occupational accidents involving falls with 23.2%, and the third rank was traffic accidents and multitrauma cases with 17.3%.[3] In a study conducted by Oktay et al. it was shown that the most frequent 112 calls were medical (57.5%), the second most common was traf-

fic accidents (21.6%) and the third most common was other accidents (7.56%).[4] In a study conducted by Özata et al. the reasons for admission to 112 Emergency Department were investigated and it was shown that the most common reason for admission was medical with a rate of 70%.[5] When we looked at the results, a similar result was obtained with our study, and it was observed that access to 112 Emergency Health Services was mostly for medical reasons. The fact that medical reasons are more frequent in FHCs can be explained by the fact that the number of chronic diseases increases with age in the area where the study was conducted, and the possibility of emergencies caused by these diseases increases.

In our study, patients were referred for CVS diseases, trauma, gastrointestinal, pulmonary and neurological reasons, respectively. In another study examining the factors affecting the practices of primary care physicians regarding emergencies, it was reported that approximately 62% of the participants felt that CVS and central nervous system emergency management should preferably be given as applied training in the emergency department of the hospital.[6] This study and our study show us once again the importance of Emergency and Cardiology rotations, which are mandatory in the curriculum of family medicine specialty training. In these rotations, the necessity of intensifying trainings especially on the management of CVS diseases in primary care has been revealed. After CVS diseases, it has been determined that trauma patients are referred the most, especially in the pediatric age group, and it is important that the management of trauma patients in primary care in family medicine specialization training is covered during the Emergency rotation in order to train competent family medicine specialists in this field.

In our study, almost half of the patients were given a yellow code, more than one third were given a green code, and very few were given a red or black code in 112 ambulance triage. In another study, when the triage codes of patients admitted to the pediatric emergency department were examined, it was found that 62.3% (n=498) of the codes were green, 35.6% (n=285) were yellow, 0.8% (n=6) were red and 1.4% (n=11) were forensic, which shows us that emergency departments are used unnecessarily with undifferentiated patients.[7] The fact that code green was lower than code yellow in our study shows that family physicians have an important role in reducing unnecessary visits to the emergency department. However, code green having a significant rate suggests that it would be appropriate to strengthen the primary health care system (education, facilities, etc.). In a study conducted by Edirne et al. 22.1% of the patients admitted to the emergency department had applied to a family health center before coming to the emergency department.[8] The most common reasons for presentation were related to the digestive system, nervous system and musculoskeletal system (27.7%, 24.6% and 11.0%, respectively).[8] In a thesis study, it was observed that 42.3% of the patients consulted the family physician before going to the pediatric emergency department and 27.4% of the patients who applied to the pediatric emergency department were referred by the family physician. In the same study, when the reasons for presentation to the pediatric emergency department were evaluated on the basis of ICD diagnostic codes, it was observed that 41.5% of the patients received a diagnostic code of J (respiratory system diseases) and 39.5% received a diagnostic code of R (symptoms and abnormal clinical and laboratory findings)[7]. In a study by Afilalo et al. it was stated that 75% of semi-urgent and 70% of non-urgent patients admitted to the Emergency Department were followed up by the physician in charge of primary health care. In the same study, 22% of non-urgent patients and 27% of semi-urgent patients had consulted a primary care physician before presenting to the Emergency Department. In this study, accessibility was found to be the reason for the low number of applications to primary health care providers in 32%, perception of need in 22%, referral/follow-up to the Emergency Department in 20%, familiarity with the Emergency Department in 11%, trust in the Emergency Department in 7%, and the reason was not clear in 7%.[9] Studies showing that patients apply to FHCs before coming to the emergency department reveal an important situation. It indicates that a strong primary healthcare service provision will increase the functionality and efficiency of the healthcare system. As more opportunities for diagnosis and treatment are provided for patients who apply to FHCs, the rate of emergency department visits will decrease. In our study, more than half of the pediatric patients referred by 112 Emergency Service ambulance from FHCs were due to trauma, neurological causes and GIS (Gastrointestinal System) diseases. While fever was the fourth most common reason, CVS diseases and respiratory system diseases were the fifth most common reasons for referral. When our study and the

studies in the literature are evaluated together, patients frequently apply to FHC; the fact that primary health care is easily accessible and that family medicine specialists provide comprehensive and continuous health care services to each individual without discriminating age, gender and disease makes family medicine specialists the first physicians to whom patients apply. It is important to strengthen the physicians working in FHCs on CVS diseases, GIS diseases, neurological diseases and respiratory system diseases. Primary care physicians should also be informed about the management of trauma patients for all patients, especially pediatric patients. In our study, pediatric patients were mostly referred for trauma. Trauma was followed by neurologic diseases, GIS diseases, fever, CVS diseases and respiratory system diseases.

In our study, when referrals were evaluated according to the age group of the cases, patients over the age of 65 were referred 52.00% for CVS diseases and 10.95% for respiratory system diseases, patients between the ages of 18-64 were referred 39.77% for CVS diseases and 11.59% for trauma, and patients under the age of 18 were referred 29.35% for trauma. While it was found that trauma and symptoms such as fever were more prominent in pediatric cases, it was found that vertigo was among the first five diagnoses in addition to the geriatric age group diagnoses, but it was observed that there was no competency level to be acquired for this disease in the curriculum of family medicine specialty training.[2] In a thesis study, 112 diagnoses were evaluated, and it was observed that patients over the age of 18 were mostly diagnosed with CVS diseases at a rate of 24.2%, falls or occupational accidents at a rate of 18%, and falls at a rate of 52% in patients under the age of 18.[3] Similar results were observed in our study, and it was found that patients under the age of 18 were more likely to be diagnosed with trauma, falls or other accidents, whereas patients over the age of 18 were more likely to be diagnosed with CVS diseases. Diagnoses of chronic diseases increase with advancing age. One of the most common chronic diseases is CVS diseases. As a matter of fact, according to the data of the Republic of Türkiye Ministry of Health Health Statistics Yearbook 2021, Ischemic Heart Disease ranks first among the Top 10 causes of YLL (Years of Life Lost) in 2019, and when the years 2002 and 2019 are compared, it is seen that this situation has an increasing trend.[10] Again, in our study, when evaluated separately in patients over 65 years of age, we see that the rate of diagnosis of CVS diseases is 52% and is higher than in other age groups. In a study by Dündar et al. evaluating the use of the Emergency Department in the age group of 65 years and older, it was found that the most common reason for presentation was cardiac diseases (40.5%).[11] When this study and our study are evaluated, the fact that admissions due to CVS diseases in the age group of 65 years and over are at the first frequency reveals the importance of follow-up and treatment of CVS diseases in this age group. At this point, person-centered care, which is one of the core competencies of family medicine specialty, comes to the fore, and longitudinal approach to patients and ensuring continuity in care gain importance.[1] For healthy aging of patients, the importance of periodic health follow-ups in family medicine specialty education is once again seen. For this purpose, Geriatric Monitoring and Evaluation was addressed as a separate topic within the framework of the Disease Management Platform (DMP) in FHCs in Turkiye and it was aimed to follow up each geriatric patient.[12] Recently, a center under the name of "YAŞAM" (LIFE) has been designed to ensure the healthy aging of the geriatric population. LIFE is planned to be situated in various regions integrated with the Geriatrics and Home Health Services department of hospitals.[13] All these contribute to ensuring more careful follow-up of this age group.

Limitations of the Research

The lack of sub-heading details of ICD diagnostic codes may have caused some data to be lost. 112 ambulance archive records may have caused incomplete information based on records in this study. The registration information of the relevant patients in the FHCs was not accessed and conducting the study only through 112 ambulance records may have caused possible data losses or inaccuracies due to the lack of data reliability, i.e. confirmation.

Conclusion

According to our study, 112 emergency ambulance was requested from FHCs for patients of all age groups mostly due to CVS diseases, trauma, GIS diseases, respiratory system diseases and neurological diseases, and it was determined that these patients were mostly referred. When the reasons for 112 emergency ambulance calls for patients under 18 years of age were evaluated, trauma, neurological diseases, GIS diseases, fever, CVS diseases and respiratory system diseases were observed respectively.

When the emergency triage codes of the cases in our study were evaluated, it was determined that 112 emergency ambulance was requested mostly for patients with yellow code, that is, unstable patients. The fact that the majority of the cases from family health centers were patients with Yellow and Red codes showed us that 112 emergency ambulance health service was used appropriately.

The contribution of family physicians to emergency health services is very important. When primary health care services are strengthened and patients' use of primary health care services is increased, it is predicted that the rate of emergency room visits can be reduced. Reducing unnecessary visits to emergency departments is of vital importance for truly emergency patients. In this regard, FHCs are expected to assume an important role and family medicine specialists should be more competent in the identified emergency case management issues. Family Medicine specialty training is an important and good opportunity for physicians to update their knowledge on needed topics. With an improved curriculum, it will be possible for family physicians to become more competent, and we think that this will further increase professional satisfaction and prestige, which are stated as the reasons for choosing family medicine.[14]

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