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The Calls to 112 Command and Control Center and Evaluation of Use of The Emergency Ambulance Service in Denizli

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Abstract

Background: In this study we studied the calls to 112 command and control center in 2012-2013 years in our province and we aimed the evaluation of use of the emergency ambulance service in our province.

Material and Method: By evaluating emergency call forms that is taken 112 command and control center head physician's office, a descriptive study was done retrospectively. SPSS 17 program is used for the statistical analysis in this study.

Result: It is identified that 51.8% of 1176126 emergency service applicants was male in 2012, 52.3% of 1185019 emergency service applicants was female in 2013. Ambulance service utilization was highest in summer (27%) and the peak value was in august. It is detected that 94% of the calls was unnecessary. The ambulance service utilization by the patients aged 65 and over was 30% in 2012 and 2013. It is also identified that the mean ambulance arrival time to the patients was 8.6 min. in 2012 and 9.1 min. in 2013. As we determined, most of the reasons of emergency calls were medical diseases (72%) and traffic accidents (12%). In the patient's classification according to their pre-diagnosis, the biggest patient group was trauma cases. In 2012 the trauma cases have had 23,3% rate among the pre-diagnosis reasons and in 2013 the value was 22,2%. In our study, the highest rate of ambulance exists is hospital transfer (64.2% in 2012, 63.1% in 2013). Most of the cases which are transported with ambulance have been gone to Denizli State Hospital (32.4%).

Conclusion: The high rate of unnecessary calls to command-and-control center (95,5%) is a serious problem for the quality of service. Because of the fact that these kinds of calls make 112 KKM busy unnecessarily; patients, which must have a priority to access to emergency services because of their severe illnesses, don't arrive on time. So education programs or public spotlights should be performed to improve the public's knowledge. The purpose of this study was to look at the seasonal distribution, age and gender distribution, and eosinophil, lymphocyte, and monocyte values according to age and gender in cases of insect bites that were brought to the emergency room over the course of a year.

Keywords: Emergency, 112 control center, Ambulance

Introduction

We live in a country where emergency diseases, accidents and injuries are common, disasters such as earthquakes and floods, and terrorist incidents are intense. For these reasons, the organizational structure and practices of emergency health services at the country level are important (1). Developments in the provision of ambulance services in Turkey started in the late 1980s. In 1986, ambulance services were started to be provided in the form of patient transportation in three metropolitan cities (Ankara, Istanbul, Izmir) under the name of "Hızır Emergency Service", and in 1994, a new system was put into operation under the name of "112 Emergency Aid and Rescue". As of this year, for the first time, a team consisting of general practitioners, nurses and drivers has started to work in ambulances. Today, health professionals trained in emergency interventions, such as paramedics and emergency medical technicians, have been added to this team (2). The Command-and-Control Center (CCC) works under the chief physician of the provincial ambulance service (3). Centers are established in appropriate physical structures with enough personnel, technical equipment and software infrastructure according to the population of the province, the number of emergency health calls, the number of stations and the characteristics of the province (4). The ability of the CCC to manage all ambulances must have all kinds of communication with other centers, emergency departments of hospitals and intensive care units. The aim of this study is to investigate the calls made to 112 CCC and the use of Emergency Health Services (ASH) in our province, and to obtain information about the functioning of emergency health services.

Materials and Method:

First of all, written approval was obtained from the XXX Provincial Health Directorate for the study. Study data were obtained from 112 CCC chief physicians. A retrospective descriptive study was conducted by evaluating the

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records of a total of 2,361,145 applications of 112 ASHs for the years 2012-2013. The variables of the study were determined according to the data available in the records. These variables are mentioned below.

Age, gender, reason for emergency call (medical diseases, traffic accident, work accident, other accidents, trauma, suicide, fire, health measures, protocol and other reasons), non-medical calls, ambulance exit rates to calls, ambulance transportation times to the scene, preliminary diagnoses of cases (cardiovascular system diseases, respiratory system, neurological, gastrointestinal system, psychiatric, genitourinary system, gynecology and obstetrics, metabolic, infectious diseases, newborn, poisonings, trauma and other causes), the results of the cases (on-site intervention, transfer to the hospital, transfer between hospitals, transfer for medical examination, transfer to home, ex, refusal of transfer, other arrivals, cancellation of duty, transfer by another vehicle, waiting at the scene, other), distribution according to the hospital they were taken to (xxx State Hospital (DDH), Servergazi State Hospital, xxxx University Medical Faculty Hospital (XXXTF), Private Hospitals, District Hospitals, Out-of-province hospitals).

During the study, the numerical proportions of 112 applications for assistance from emergency health services in 2012-2013 in XXX province, as well as the numerical proportions of unnecessary calls made to 112 health services during the study period were examined. The following data were found in the searches related to the actual disease in the admissions:

1. Ambulance exit rates to calls
2. Distribution of cases by gender
3. Distribution of cases by age
4. Transit times analysis
5. Analysis of diseases according to their preliminary diagnosis
6. Distribution of cases according to the reasons for the call
7. Distribution of cases by results
8. Distribution of hospitals visited

In the data prepared using the SPSS 17 statistical system, the T Test was used to determine the transportation rates in the urban. The Mann Whitney U Test was used to determine rural and general transportation rates. The Pearson chi-square test was used to determine the distribution of cases by age and gender, analysis by seasons, analysis by reasons for calling, distribution of cases according to results, and distribution of cases according to the hospital where they were taken

Result

During the two-year study, it was determined that there were a total of 2,361,145 applications by phone (1,176,126 calls in 2012, 1,185,019 calls in 2013) from the 112 ASH records of the Provincial Health Directorate. The distribution of medical calls to CCC by month and the rate of ambulance assignment to these calls are given in Table 1. When the seasonal distribution of the calls made during the study period was examined, it was determined that it was more in the summer months (spring 23.5%, summer 27.4%, autumn 24.9%, winter 24.2%). In 2012, the rate of non-medical unnecessary calls was 94.3% (n=1,110,020) and in 2013 it was 94.2% (n=1,116,652). It was determined that there was no difference in the distribution of patients who received medical calls according to gender (p<0.001). Men (51.9%) in 2012 and women (52.3%) in 2013 were in the majority. When the distribution of patients by age was examined, it was determined that 112 ambulance systems frequently served patients between the ages of 18-64 (58.2%), while the percentage rates of pediatric and over-65 patient groups were 11.3% and 30.5%, respectively.

Table 1: Distribution of cases with and without ambulance exit by month.

	Entire Medical Calls n (%)	Those with ambulance exit n (%)	Those who do not have an ambulance exit n (%)
January	10564 (7,85)	9244 (7,84)	1330 (8,02)
February	10345 (7,69)	9045 (7,67)	1300 (7,84)
March	10778 (8,01)	9473 (8,03)	1305 (7,87)
April	10821 (8,04)	9129 (7,74)	1581 (9,53)
May	11221 (8,34)	9884 (8,38)	1337 (8,06)
June	10845 (8,06)	9465 (8,02)	1380 (8,32)
July	11826 (8,79)	10524 (8,92)	1302 (7,85)
August	12238 (9,10)	10918 (9,26)	1420 (8,56)
September	11307 (8,40)	10038 (8,51)	1269 (7,65)
October	10918 (8,11)	9581 (8,12)	1337 (8,06)
November	11753 (8,74)	10273 (8,71)	1480 (8,92)
December	11857 (8,81)	10317 (8,75)	1670 (10,07)
Sum	134473	117881	16581

In 2012, the average transportation time of 112 ambulances to cases was 8.6 minutes, while in 2013 this time increased to 9.2 minutes. During the study, the distribution of transportation times by ambulance to the patients by months is given in Table 2. In 2012, 112 ambulances reached the cases in an average of 6.5 minutes in urban areas, while in 2013 this period was determined as 6.9 minutes. A statistically significant difference was found when the urban transportation rates of 2012 and 2013 were compared (p<0.001). In 2013, it was determined that this period was longer. In 2012, 112 ambulances reached an average of 15.2 minutes in rural areas, while in 2013 this period was determined as 15.5 minutes. A statistically significant difference was found when the transportation rates in rural areas in 2012 and 2013 were compared (p=0.022). During the study period, medical cases were found to be the most common reason for calls (71% in 2012 and 73% in 2013).

Table 2: Distribution of non-medical junk calls by month

PERIOD	URBAN TRANSPORTATION RATE %	URBAN TRANSPORTATION TIME MIN	TRANSPORTATION RATE IN RURAL AREAS %	TRANSPORTATION TIME IN THE COUNTRYSIDE MIN	TRANSPORTATION TIME MIN (GENERAL)
JANUARY	88,36	6,95	93,1	16,3	9,15
FEBRUARY	88,43	6,85	92,81	16,05	8,95
MARCH	90,03	6,6	94,49	15,15	8,5
APRIL	89,17	6,6	95,92	14,7	8,6
MAY	87,92	6,7	94,91	15,5	8,85
JUNE	89,28	6,6	95,11	15,3	8,85
JULY	88,07	6,75	94,82	15,4	9,05
AUGUST	89,68	6,65	94,52	15	9,25
SEPTEMBER	88,98	6,75	95,2	15,6	9
OCTOBER	88,92	6,75	95,58	15,25	8,9
NOVEMBER	89,75	6,65	95,24	14,95	8,55
DECEMBER	86,9	7	93,28	15,7	8,8
ANNUAL AVERAGE	88,79	6,7375	94,58166667	15,40833333	8,870833333

When the analysis of the patients with ambulance exit according to the preliminary diagnoses was examined, it was determined that trauma cases (23.3% in 2012, 22.2% in 2013) constituted the largest patient group. This was followed by cardiovascular system diseases and psychiatric diseases, respectively. It constitutes the most important part of the During the study, the distribution of cases according to reasons for calls and preliminary diagnoses is presented in Table 3. The distribution of cases according to the results is given in Table 4. It was determined that most of the cases resulted in transfer to a hospital (63.6%). Finally, it was investigated to which hospitals 112 ambulances transported patients throughout the province. In 2012 and 2013, the percentage of patients transplanted by year... increase (32910 in 2012, 35171 in the following year). The two largest public hospitals across the province were the hospitals with the highest number of cases (32% and 19%, respectively). This

Table 3: COVID-19 articles in journals

Journal	*Total Articles*	*Total COVID-19 Articles*	*Total COVID-19 Articles/Total Articles*
Ulus Travma Acil Cerrahi Derg	511	33	0,06
TJEM	112	10	0,08
EAJEM	130	16	0,12
J Emerg Med Case Rep	109	11	0,1
Anatolian J Emerg Medicine	82	8	0,09
Eurasian J Crit Care	77	9	0,11
Eurasian J Tox	48	0	0
Glob Emerg Crit Care	12	4	0,33

Ulus Travma Acil Cerrahi Derg: Turkish Journal of trauma and Emergency Surgery **TJEM:** Turkish Journal of Emergency Medicine, **EAJEM:** Eurasian Journal of Emergency Medicine, **J Emerg Med Case Rep:** Journal of Emergency Medicine Case Reports, **Anatolian J Emerg Medicine:** Anatolian Journal of Emergency Medicine, **Eurasian J Crit Care:** Eurasian Journal of Critical Care, **Eurasian J Tox:** Eurasian Journal of Toxicology, **Glob Emerg Crit Care:** Global Emergency and Critical Care

Table 3: Distribution of cases according to reasons for calls and preliminary diagnoses during the study period

Reasons for the call	**N: 89028**	**%**
MEDICAL	64219	72%
TRAFFIC ACCIDENT	11096	12%
WORK ACCIDENT	998	1%
OTHER ACCIDENTS	7693	9%
INJURY	2247	3%
SUICİDE	1789	2,00%
FIRE	339	0%
HEALTH PRECAUTIONS	445	0%
PROTOCOL	70	0%
OTHER	132	0%
Preliminary diagnoses	N:85030	%
KVS	16189	%19,03
RESPIRATORY SYSTEM	5799	%6,81
NEUROLOGICAL	2944	%3,46
GIS	1284	%1,51
PSYCHIATRIC	9936	%11,68
NYD	1910	%2,24
OBSTETRICS	1189	%1,39
METABOLİC	1915	%2,25
INFECTIOUS DISEASES	465	%0,54
NEWBORN	177	%0,2
POISONINGS	2064	%2,42
TRAUMA	19336	%22,74
OTHER	21822	%25,66

Table 4: Distribution of cases according to reasons for calls and preliminary diagnoses during the study period

	n (%)	%
TRANSFER TO THE HOSPITAL	56655	63,6
TRANSFER BETWEEN HOSPITALS	11447	12,8
REJECTION OF TRANSPORT	8456	9,5
ON-SITE INTERVENTION	3849	4,3
OTHER ACHIEVEMENTS	2983	3,4
EX (LEFT AT THE SCENE)	1636	1,8
TASK CANCELLATION	1461	1,6
TRANSPORT BY ANOTHER VEHICLE	862	1
WAITING AT THE SCENE	504	0,6
HOME TRANSFER	99	0,1
TRANSPLANT FOR MEDICAL EXAMINATION	30	0,03
OTHER	1046	1,2
SUM	89028	

was followed by university hospital and private hospitals (16% and 9%, respectively). When the years 2012-2013 were compared, there was a significant difference between the hospitals where the cases were taken ($p<0.001$). This difference was especially observed in Denizli State Hospital and Private Hospitals. While patient transfers to Denizli State Hospital decreased during the study period, patient transfers to private hospitals increased (Table 5).

Discussion

In recent years, positive developments have been observed in ambulance services in major cities in Turkey, including Denizli, but there has been a significant increase in the use of emergency call services by patients of all age groups. During the study period, the total number of calls for Denizli Provincial Health Directorate 112 Emergency Services is close to 2.5 million. The number of calls per year averages over one million. When non-medical calls are excluded, the total number of medical calls in 2012 is 66 thousand, and the total number of medical calls in 2013 is around 68 thousand. When this number is proportional to the population, it is around 7% of the total population. In the study of Benli et al. covering the year 2013 in Karabük province, the total number of applications was determined as approximately 22 thousand (14, 15). In the study of Zenginol et al. examining the operation of 112 emergency ambulances in Gaziantep between 2006 and 2008, it was determined that the number of ambulance exits increased every year (16, 17). In our study, it was determined that the number of calls increased over the years. In addition to the increase in the population of Denizli, the increase in the public's knowledge about the use of 112 emergency health services may have been effective in these results. In Europe, the use of emergency health services has gradually increased over the years. In a study conducted in England in 2006, it was observed that the number of ambulance calls between 1997 and 2002 was compared and the number increased every year (18).

Table 4: Distribution of cases by hospitals during the study period

HOSPITAL NAME	NUMBER OF CASES TAKEN TO HOSPITALS IN 2012	NUMBER OF CASES TAKEN TO HOSPITALS IN 2013
DENIZLI STATE HOSPITAL	10969	11079
SERVERGAZI STATE HOSPITAL	6103	6542
PAUTF	5116	5551
PRIVATE HOSPITALS	2889	3441
DISTRICT HOSPITALS	7623	8309
OUT-OF-PROVINCE HOSPITALS	210	249
SUM	32910	35171

In the study conducted by Demirkan et al. in 2013, 330 patients diagnosed with ACS were analyzed and it was determined that only 29% of these patients were brought by ambulance (19). In the study of Türkdoğan et al. in Isparta province covering the year 2011, the ambulance usage rate was 3% (20). In the study of Önge et al. in Adana province covering the dates of December 1, 2009-December 31, 2010, the annual ambulance usage rate was found to be 0.5%. (21,22). In a 2003 national survey conducted in the USA (6), it was found that 14% of the 114 million people admitted to emergency services for various reasons used an ambulance. The ambulance utilization rate in London was reported to be 14% in 2002 (7, 8). The rate of ambulance usage is very low in our country. In the use of the ambulance service; The education level of the people, their expectations, the level of national income, the economic status of the patients and whether they have health insurance or not are the determining factors. Although there have been quantitative and qualitative improvements in ambulance services in recent years, especially in provinces with metropolitan municipalities, the use of ambulance services in Turkey lags behind developed countries.

All these data support that 112 health services are frequently used in the summer months in our country. However, very different results have been found in similar studies conducted in our country. In the study conducted by Benli et al. in 2013, it was determined that the use of emergency health services was highest in the winter months (14). In their study, Nur N. et al. found that there was no difference between the seasons and months of ASH use in geriatric patients, but they pointed out that the use of ASH increased in the winter months (23). In the study of Dündar et al., which investigated the use of emergency services

by geriatric patients, it was determined that the highest ambulance call rate was in the winter months (24).

In our study, the rate of non-medical (unnecessary) calls was 97% among all calls made to 112 CCCs in 2012 and 94% in 2013. It has been determined that these unnecessary searches often increase during the summer months. It was reported that approximately 70% of the calls received by 112 CCCs in Afyon province were unnecessary calls (25-29). These results show that most of the calls made to CCC in our country are made for non-health reasons.

During our study, it was determined that 88% of the medical calls made to Denizli 112 CCC were ambulance exits. This rate is higher than we anticipated. For comparative purposes, no data on this subject could be found in our country. How many of these ambulance exits are for real emergencies should be uncovered by wider research.

In our study, no significant difference was found when the patients using emergency health services were examined according to gender. However, studies conducted in our country often determine that the male gender uses 112 health services. In the study of Kapçı et al. covering the first half of 2013, it was determined that 55% of the cases coming to the emergency department by ambulance were male (15). In the study conducted by Benli et al. in Karabük province in 2013, it was determined that 56% of the searches were made by men (14). In a one-month study by Karakuş et al. covering January 2013, it was determined that 51% of the patients admitted to the emergency department with 112 were male (30). In the study conducted by Önge et al., it was determined that 53.5% of the patients were male (21). In the study conducted by Yurteri et al. in Bursa, it was determined that 63% of the calls were made by men (31). Yildiz M. et al. In the study he conducted in Elazığ province, 60.5% of them, Çetinoğlu EC. et al. In the study conducted in Samsun province, 66% of them were men (32-33). In a three-year study conducted by Zenginol et al., it was determined that male cases were more common (17). In overseas studies, it has been determined that the rate of use of emergency health services by the male gender is high. In an eight-month study conducted by Olia et al. in Italy, in which they examined cases transported to the emergency department by ambulance, it was determined that 53.5% of the calls were male cases (34). In the study conducted by Kawakami et al., it was determined that male cases tended to call ambulances more than women (28).

There are also studies in the literature reporting that the female gender is dominant in the use of 112 emergency health services.

In our study, when the distribution of cases by age was examined, age groups; It is divided into 0-17 years old, 18-64 years old, 65 years and over. 112 The age group that uses emergency health services the most is 18-64 (58%). The rate of cases aged 65 and over has been determined as 30%. In our study, there was no statistically significant difference in the age group distribution in both years. In the study conducted by Kawakami et al., it was reported that one of the most important factors affecting ambulance use is age. It was revealed that the decision to call an ambulance was made more easily in the elderly (28). In the study conducted by Victor et al., it was stated that 40% of all ambulance calls in London were made by people aged 60 and over (35). In the study conducted by Kıdak et al., it was stated that approximately one-fourth (26.7%) of the total applications in 2004-2005 were elderly people aged 65 and over (2). In the study conducted by Zenginol et al., when the number of cases by age groups was examined, it was determined that the case group over the age of 65 was the highest (17.9%) in three years (17,31,36).

In pre-hospital care, the time to reach the area where the intervention will be made is very important. This time has been reported by the American Heart Association as eight minutes for advanced cardiac life support ambulances (17). Experts reported that at least 20% of those who lost their lives could be saved with conscious, high-quality, accurate and fast emergency aid services (37). In our study, when the transportation times were examined by years, it was determined that 89% of the cases in 2012 reached the scene in 6.5 minutes, and 87% of the cases in 2013 reached the scene in 6.9 minutes. Altintas KH. et al. In the study conducted in Ankara, they found that the transportation time of ambulances to the case was 15% under 5 minutes, 35.5% in 5-9 minutes, 26% in 10-14 minutes and 24% in over 15 minutes (38). In the study of Karakuş et al. covering January 2013, the rate of cases reached in 10 minutes or less was 68.3% and 80% of the cases could be reached in the first 13 minutes (30). In the study conducted by Önge et al., the time elapsed during the transfer of patients from the scene by ambulance to the hospital was determined and it was determined that 45.5% of them were brought to the hospital in 20-29 minutes (21). As a result, the ambulance transportation rates we obtained in our study are at acceptable levels for our country.

Studies on average ambulance arrival times in the literature vary greatly according to the country. Ong ME. et al. In his study in Singapore, the average arrival time was found to be 8 minutes (39). Campbell et al. reported the response time in the United States as 8.2 minutes (40, 41). In the study of Stoykova et al., while the response time was 8 minutes for 50% of emergency calls in 1996, this rate was found to be 75% in 2001 (42,43). In the study conducted by Zenginol et al. in Gaziantep, the first three reasons for calls were medical cases with 54.6%, traffic accidents with 16.3% and transport cases with 11.9% (17). In the one-month study conducted by Karakuş et al., it was seen that the most common reasons for admission were multiple trauma (18.2%), chest pain (10.6%), pulmonary diseases (9.4%) and neurological diseases (8%) (30,34,44).

When the cases were analyzed according to their preliminary diagnoses, it was determined that trauma

cases constituted the largest patient group in our study. In 2012, trauma cases accounted for 23.3% of the total number of cases, and in 2013, 22.2%. This was followed by cardiovascular system diseases and psychiatric diseases, respectively. According to the 2006 data of the General Directorate of Primary Health Services, trauma ranks first with 25.7% of emergency case pre-diagnoses in Turkey, while CVS diseases rank second with 19.5% (43). In the same yearbook, trauma (24.3%), cardiovascular system diseases (20.6%) and neurological diseases (10.7%) were the most common causes among the preliminary diagnoses in Izmir (T.R. Ministry of Health General Directorate, Primary Health Service, 2007). When we look at most of the studies conducted in our country, it is seen that trauma is in the first place in preliminary diagnoses. Oktay I. et al. In the study conducted in Tekirdağ province, when the preliminary diagnoses of the cases were examined, trauma (33%) ranked 1st, CVS diseases ranked 2nd (18.5%), neurological diseases ranked 3rd (14%), and 4th place were examined by trauma (33%), 2nd place were CVS diseases (18.5%), 3rd place neurological diseases (14%). They found that psychiatric disorders were next (14.5%) (16). In the study conducted by Önge T. et al. in Adana, when the preliminary diagnoses of ambulance teams were examined, they found that trauma calls were in the first place (28%), neurological diseases in the 2nd place (16%) and CVS (14%) in the 3rd place (21,44).

Some studies conducted in 112 health services in our country have shown that non-traumatic causes are more common in preliminary diagnoses. In the study conducted by Dündar et al. in Samsun, when the cases were examined according to their preliminary diagnoses, cardiac diseases (40.5%), neurological diseases (17%) ranked 2nd, respiratory diseases ranked 3rd (10.5%), and trauma (7%) ranked 4th (24,31).

In our study, most of the cases resulted in transfer to the hospital in both years. In 2012, this rate was 64%, while in 2013 it was 63%. Looking at the results of the study conducted by Oktay et al. in Tekirdağ, it is seen that the number of transfers to hospitals has decreased (from 74.4% to 68.4%) and there has been an increase in on-site interventions (from 9.1% to 18.4%) (16). Many studies have reported that the majority of cases result in hospitalization (15, 44, 45). In the three-year study of Zenginol et al. in Gaziantep, it was stated that 62.5% of the cases resulted in hospital transfer and 13.5% resulted in on-site intervention. (17). In the study conducted by Kıdak et al. in Izmir, it was determined that 52% of the cases resulted in transfer to the hospital, and 19% of the cases were intervened on site (2). In the study conducted by Dündar et al. in Samsun, 73.7% of the cases resulted in hospitalization, while 18.4% of them were treated on-site (24). In the study conducted by Yurteri et al. in Bursa, most of the cases were taken to the hospital (31). In the study conducted by Hipskind et al., 30% of ambulance responses in the USA resulted in refusal of transport, and these patients were mostly asymptomatic patients between the ages of 11 and 40 who had been involved in motor vehicle accidents (46). In England and Wales, 17% of patients were not transported to hospital after an emergency ambulance call (45). In a study in the USA, it was reported that 7 out of every 10 patients resulted in a transfer to a hospital (47). When we evaluate the results of all these studies, it is suggestive that the fact that most of the cases result in hospitalization and that most of the patients brought to the hospital are discharged from the emergency departments is a global problem. Large-scale studies should be carried out to reduce the unnecessary use of ambulances in our country and health policies should be developed according to the results.

Limitations: Since the ages of the patients were divided into pediatric (0-17 years), geriatric (over 65 years old) and others, the age groups were classified in this way.

Conclusion:

The study's results are promising for the development of 112 emergency health services in our province. However, the high rate of unnecessary calls to the CCC (95.5%) is a significant issue that affects service quality. These calls delay responses to urgent cases, so public awareness campaigns and education are needed. The study found that ambulance response times in urban and rural areas were acceptable, but future population and traffic growth could impact these times. Emphasis should be placed on educating drivers about ambulance priority and on enhancing trauma care training for 112 personnel.

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