



# Workplace Interruptions in Emergency Department, Causes, Management and Results: A Pilot Study

*Acil Serviste İş Kesintileri, Nedenleri, Yönetimi, Sonuçları; Pilot Çalışma*

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## ABSTRACT

**Aim:** Emergency medicine is the most important hospital unit where the time usage should be efficient. Even a little time lost here can endanger the lives of patients. Employees should not lose their concentration and evaluate patients who come very carefully. However, it should not be forgotten that employees are interrupted in some cases. For example, an incoming text message to the doctor at the time of service may interrupt his/her work. Researches in the literature show that doctors and other emergency service employees are frequently interrupted during their shifts. Aim: It was aimed to determine the interruptions experienced by the physicians working in the emergency department during their shifts. The causes and consequences of these interruptions were also examined.

**Material and Method:** This is a cross-sectional observational study. The physicians working in the emergency room will be monitored during their work by two researchers. Causes of interruption, duration of interruption, time interval, emergency room occupancy rate, the doctor's work during the interruption, management of the interruption was recorded.

**Results:** 21 physicians were observed for 72 hours, physicians in the emergency services have been interrupted for 1975 times in 72 hours. It showed that there were 5.8 interruptions per hour. The total interruption was 469.05 minutes. The most common interruption reason has found as telephones in the study. Interruptions usually occurred when the doctors were examining the results of a patient.

**Conclusion:** Interruptions are one of the basic problems of the emergency services and they are the main factors of medical mistakes. The doctors should never try to be multi-tasked and they should respond the interruption after finishing their work.

**Key words:** emergency services, workplace interruptions, medical staff

## ÖZET

**Amaç:** Acil tıp, zaman kullanımının verimli olması gereken en önemli hastane birimidir. Burada kaybedilen kısa bir süre bile hastaların hayatını tehlikeye atabilir. Bu birimde çalışanlar konsantrasyonlarını kaybetmemeli ve gelen hastaları çok dikkatli değerlendirmelidir. Ancak, bazı durumlarda çalışanların kesintiye uğradığı bilinmektedir. Örneğin, iş sırasında doktora gelen bir kısa mesaj, çalışmasını kesintiye uğratabilir. Literatürdeki araştırmalar, doktorların ve diğer acil servis çalışanlarının vardiyaları sırasında sıklıkla kesintiye uğradığını göstermektedir. Acil serviste görev yapan hekimlerin vardiyaları sırasında yaşadıkları kesintilerin belirlenmesi amaçlanmıştır. Bu kesintilerin nedenleri ve sonuçları da incelenmiştir.

**Materyal ve Metot:** Bu kesitsel bir gözlemsel çalışmadır. Acil serviste çalışan doktorlar çalışmalarını sırasında iki araştırmacı tarafından izlenmiştir. Kesintinin nedenleri, kesinti süresi, zaman aralığı, acil servis doluluk oranı, doktorun kesinti sırasındaki yaptığı iş, kesinti yönetimi kaydedildi.

**Bulgular:** 21 doktor 72 saat boyunca gözlemlendi. Bu süre içinde doktorlar toplam 1975 kez kesintiye uğradı. Saatte 5,8 kesinti olduğu görüldü. Kesintilerin toplam süresi 469,05 dakikaydı. Çalışmada en yaygın kesinti nedeni telefon olarak bulunmuştur. Kesintiler genellikle doktorlar hastanın sonuçlarını incelerken oluştu.

**Sonuç:** Kesintiler acil servislerin temel sorunlarından ve tıbbi hastaların ana faktörleri arasındadır. Doktorlar birden çok görevi aynı anda yapmamalı ve mevcut işlerini bitirdikten sonra bir diğer işe geçmelidirler.

**Anahtar kelimeler:** acil servis, işyeri kesintileri, sağlık personeli

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## Introduction

Emergency medicine is a dynamic section characterized by medically complex cases and simultaneous management of multiple patients. In emergency services in hospitals or health facilities, the service should be provided 24/7. In these places, the employees should always keep their attention on the patients, should use their time, energy and tools efficient. Out of emergency and health causes, these services can be thought as the “display case” of a hospital. The quality in these services directly perceived as the “whole” of the health care center<sup>1</sup>. The emergency departments of the hospitals are fast-paced environments and they are characterized by frequent interruptions<sup>2</sup>. For increasing the successibility of the emergency services, the interruption management should be done<sup>3</sup>. The interruptions cause losing time but more important these are causing mistakes. Most of the doctors are trying to interest with their work and interruption resource at the same time –multi-tasking– but they mostly forget what they were thinking or planning and this causes making mistakes<sup>4</sup>. Multi-tasking may cause disruption in the primary task and may contribute to error<sup>2</sup>. According to Ratwani et al., the doctors who are working in the emergency services are interrupted about 9 times in one hour and in 8 hours shift a doctor can be interrupted about 48 times<sup>5</sup>. Berg and his friends measured that interruption rate was 5.1 interruptions per hour in a hospital in their study<sup>3</sup>. Chisholm et al., found that emergency physicians were interrupted an average of 9.7 times per hour<sup>4</sup>. Another study of Chisholm showed that the doctors have been interrupted 9.7 times<sup>3</sup>. Of course some of these interruptions may be beneficial for the health care of the patient or the emergency workers but, they also can be disruptive to work flow. And if it would be thought as economic loss or medical losses, these amounts would be more important<sup>5</sup>.

It is unclear how emergency physicians’ interruptions affect patient care. Some interruptions are necessary and useful in-patient care but most of them disrupt the workflow. Interruptions can sometimes cause stress and mistakes. Strategies should be developed to reduce interruptions of emergency physicians and for a better management of them. The goal of this study is to determine the interruption of the doctors who are working in our emergency service, determine how they manage these interruptions and see the results of them. In the emergency services, for managing the interruptions first of

all their reasons and frequencies of them should be understood. Then the methods can be found to decrease them. If these could be done, the service quality would be higher. In this study we aim to determine the number of interruptions and to characterize interruptions in emergency department settings.

## Materials and Methods

This is a cross-sectional observational study conducted in University of Ataturk, Department of Emergency Medicine, Erzurum, Turkey in May 2018. Ethics committee approval was received for this study from the Ethics Committee of Ataturk University Medical Faculty (15.02.2018- decision number: B. 30.2. ATA. 0.01.00/69). The physicians working in the emergency room monitored during their work by two researchers. 2-hour training was given to the researchers before the study begins. Interruptions, physicians reaction to the interruptions and the result of interruption were recorded. The working emergency doctors were unaware that they were being watched. Our study was planned on 6 physicians working in emergency department. 12:00–24:00 were determined as the busiest hours of emergency services.

**A. Causes of interruption:** The reasons of the interruption of the doctor were observed and recorded. The interruptions caused by the 6th grade students of the Faculty of Medicine were grouped under the name “intern doctor interruptions”. Interruptions caused by the exchange of information with other clinics’ physicians were grouped as “consultant physician interruptions”. Questions of the patient or their relatives were grouped as “patient or their relatives’ interruptions”. The interruptions caused by the exchange of information with other emergency doctors, fellow or lecturers, were grouped as “emergency doctor interruptions”. The interruptions caused by answering the hospital phone were grouped as “phone interruptions”. Interruptions caused by malfunction and other problems in electronic file management system and other electronic equipment used during patient care are grouped as “technological interruptions”. The interruptions caused by the emergency medical service personnel were called as “EMS interruptions”. The interruptions caused by the SMS or calls from the personal cell phone of the doctor is called as “social interruptions”. The interruptions caused by the exchange of information or questions from the nurses about the patients were called as “nurse interruptions”. Other medical personnel (triage

worker, patient transport workers, radiologist, etc.) interruptions were called as “other medical personnel interruptions”.

**B. Interruption duration:** Every interruption has been recorded as seconds. The time measurement has done by using an electronic stopwatch.

**C. Time interval:** The study has done between 12:00 and 23:59 during the day. This time interval was divided into three parts, 12:00–15:59, 16:00–19:59 and 20:00–23:59, and the time interval of the interruption was recorded.

**D. Emergency room occupancy rate:** The occupancy rate of the emergency service was recorded. The occupancy rate was found by dividing the number of patients who were examined and monitored during the interruption by the total number of beds (excluding intensive care and resuscitation beds) for examination and observation. Accordingly, the occupancy rate was grouped as <20%, 20% -40%, 40% -60%, 60% -80% and >80%.

**E. The doctor’s work during the interruption:** The working doctor has been watched during the interruption and recorded also. If the doctor was interrupted during he was examining results or monitoring the laboratory examinations or images, the interruption has been called as “interruption during examining the results”. If the doctor was interrupted during he was talking to the hospital phone, the interruption has been called as “interruption during phone call”. If the doctor was interrupted during he was informing the patient or his/her relatives, the interruption has been called as “interruption during informing the patient or relatives”. If the doctor was interrupted during he was talking to another doctor, nurse or any other medical staff, the interruption has been called as “interruption during talking to medical personnel”. If the doctor was interrupted during he was writing a prescription, the interruption has been called as “interruption during writing a prescription”. If the doctor was interrupted during he was consulting, the interruption has been called as “interruption during consulting”. If the doctor was interrupted during he was reading a medical book or article, the interruption has been called as “interruption during examining educational document”. If the doctor was interrupted during he was recording the information about the patient, the interruption has been called as “interruption during creating the documents”.

**F. Management of the interruption:** The methodology of the doctor has been used to manage the interruption has been watched and recorded. If he has quit his work and has been interested in the cause of the interruption, this was grouped as “responded”. If he has been continued on his work and interested with the interruption after he has finished, this was grouped as “procrastination”. If he has been interested with the interruption during he was continuing to his work this was grouped as “multi-task”.

**G. What has done after interruption:** The activities done by the doctor were watched and recorded if he managed the interruption by responding. If he continued to his work after interruption, this has been grouped as “resume”. If he has started to be interested with another work after interruption, this has been grouped as “canalized another work”. If he has leave his work incomplete after interruption, this has been grouped as “had a break”.

### *Statistical analysis*

The SPSS 20.0 statistical software package was used for statistical analysis. Descriptive statistics were given with frequency, percentage, mean, and standard deviation. Pearson’s Chi-square and Fisher’s exact test were used to interpret the data. A Kolmogorov-Smirnov distribution test was used to examine the normal distribution, and a Mann-Whitney U test was used to compare the parameters between groups. P-value less than 0.05 is considered statistically significant.

## **Results**

During the study period, there were 21 emergency physicians who were active in the clinic. During the study, 12 doctors (57.1% of all doctors) were observed for a total of 72 hours and 1975 work interruption recorded. There were 110.7 work interruption as an average per hour. The most common cause of interruption was, “intern doctor interruption” (45.1%, 12.3 interruptions per hour), secondly was “patient or relatives’ interruption” (21.3%, 5.8 interruptions per hour) and thirdly was “emergency doctor interruption” (10.3%, 2.83 interruptions per hour). The interruption causes and their ratio has shown in Figure 1.

The total duration of interruptions observed during the study period was 28143 seconds (469.05 minutes). The duration of all interruptions was 10.8% of the total observation period in the study. The median time

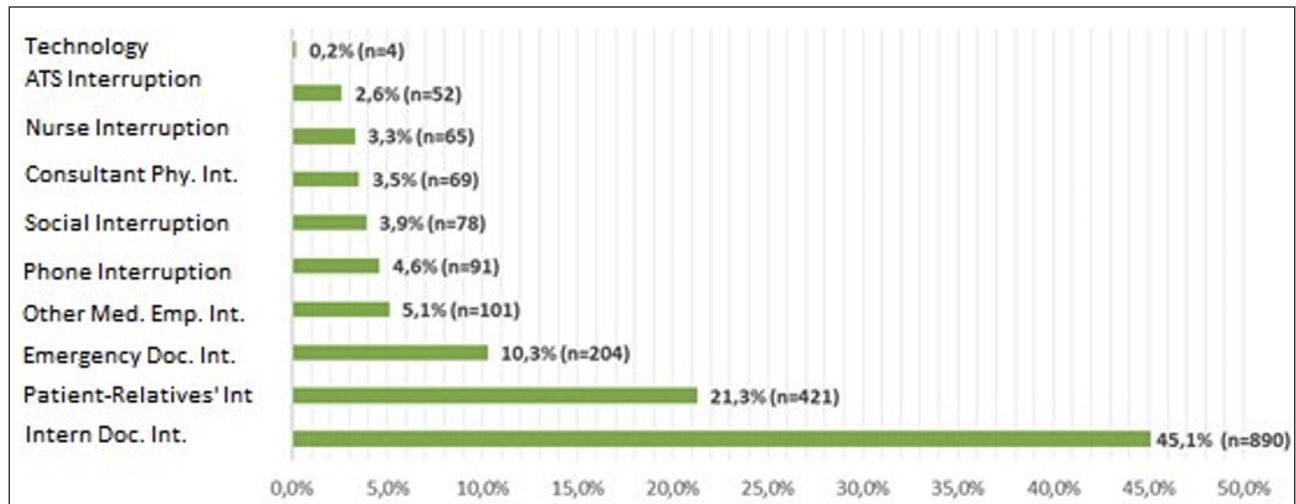


Figure 1. Interruption causes.

per interruption was 7 seconds (min: 1, max: 772). The median durations ranged from one interruption type to other and this was statistically significant ( $\chi^2=172.633$ ,  $p<0.001$ ). The longest median period per interruption were because of “phone interruptions”, secondly “ATS interruptions” and “emergency doctor interruptions” (24 sec vs 13.5 sec vs 9 sec). When evaluated in terms of total time, it was found that the longest interruption time was 8347 seconds with “emergency doctor interruption”. The distribution of the causes of the interruption and the length of the downtime are shown in Table 1.

The watching time has been divided into three equal durations and it is found that 41.2% of all interruptions were between 12:00–15:59, 26.6% were between 16:00–19:59 and 32.2% of all interruptions were between 20:00–23:59. There was no statistical difference between the predetermined time intervals and the median values of downtime ( $p>0.05$ ). 32.7% of all interruptions occurred between 40–60% of the emergency room occupancy, 30% of them occurred emergency room occupancy was 80% and 100%. 25.8% of them occurred when emergency room occupancy was in the range of 60–80% and 9% of them occurred when

Table 1. Duration and causes of interruptions

Interruption causes	Interruption number n (%)	Interruption time					Total (sec)	P value $\chi^2$
		Median (sec)	Minimum (sec)	Maximum (sec)	Mean (sec)	Standard deviation ( $\pm$ )		
Technology	4 (% 0.2)	6.50	1	21	8.75	9.03	35	$p=0.000$ $\chi^2=172.633$
ATS	52 (% 2.6)	13.50	3	106	20.04	17.99	1042	
Nurse	65 (% 3.3)	5.00	2	29	7.06	5.14	459	
Consultant doc	69 (% 3.5)	8.00	1	49	12.13	11.43	837	
Social	78 (% 3.9)	7.00	1	52	11.46	11.66	894	
Telephone	91 (% 4.6)	24.00	4	156	28.55	24.73	2598	
Other med. Emp.	101 (% 5.1)	6.00	1	102	9.24	12.14	933	
Emergency phy.	204 (% 10.3)	9.00	1	772	40.92	102.54	8347	
Patient-relatives	421 (% 21.3)	7.00	1	80	13.37	14.24	5629	
Intern doctor	890 (% 45.1)	7.00	1	67	8.28	6.83	7369	
All interruptions	1975 (% 100)	7.00	1	772	14.24	36.10	28143	

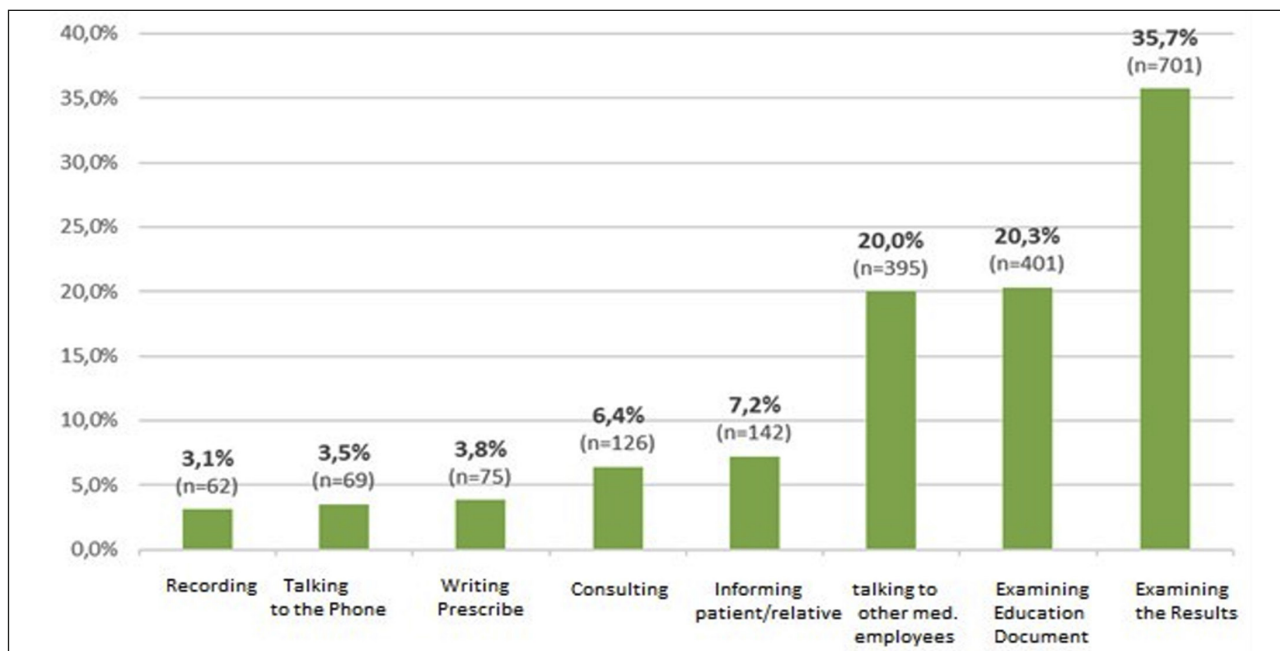


Figure 2. Activities done by the doctor during the interruption.

emergency room occupancy rate was between 20–40%, 2.2% of them occurred when emergency room occupancy was below 20%. When the relationship between emergency room occupancy rates and the duration of interruption was examined, no statistical significance was found ( $p > 0.05$ ).

The interruptions occurred commonly while the doctor was examining the results of a patient (35.7%,  $n=701$ ), secondly occurred while the doctor was recording the patient information (3.1%,  $n=62$ ). The activities and distributions of the doctor during the interruption are shown in Figure 2. In 83.1% ( $n=1641$ ) of all interruptions, the physician managed the interruption by “responding”, and by “multi-task” in 15.5% ( $n=307$ ). He managed the interruptions by “resume” in only 1.4% ( $n=27$ ) of interruptions. Accordingly, in total 98.6% of all interruptions, the physician was immediately interested with the interruption. Resumed interruptions were interruption of the “intern physician” (66.7%,  $n=18$ ), interruption of “patient or relatives” (29.6%,  $n=8$ ) and interruption of “other health personnel” (3.7%,  $n=1$ ). The doctors’ activity after the response was also observed. In 82.8% ( $n=1358$ ), the physician continued his work from where he left after the interruption, in 17.2% ( $n=282$ ) he left his job and turned to another job, in 0.1% ( $n=1$ ) he left his work and took a break.

The reasons of “patient and relatives’ interruption” were examined, the most common cause was trauma ( $n=97$ , 23%). Cardiovascular ( $n=88$ , 20.9%), neurological ( $n=64$ , 15.2%), infection ( $n=63$ , 15%), gastrointestinal ( $n=62$ , 14.7%) and other causes ( $n=47$ , 11.2%).

## Discussion

Although the issue of efficient use of time is very important in emergency services, physicians working here often face to interruptions. The literature survey shows that the situation is the same all over the world. The results of this study it is found that the doctors in the emergency service are interrupted about 110.7 times in a working hour. And most of the interruptions are coming from other staff, patients and their relatives. The findings are similar to the literature.

Because of the interruptions, out of the time loss, the mistakes can be happen and any mistake can cause vital problems in the patient. Raban et al. saw that especially while the doctors are trying to be multi-tasked, they have a lack of concentration. Out of doctors, nurses and other medical employees can be interrupted and this can cause problems in immediate treatment. The authors think that the interruptions are one of the basic causes of medical errors<sup>4</sup>. Ratwani and his friends found that the doctors in a shift can

be interrupted at about 48 times and this equals to about nine times per one working hour<sup>5</sup>. As Ratwani et al. and Chisholm et al. checked the subject in their report and they found that a doctor usually has to stop about 9.7 times in an hour<sup>4</sup>. Those shows that interruptions are huge time losing problems in the emergency services and also they may cause medical mistakes. For not making mistakes the doctors are trying to make two or more things at the same time and this is called being multi tasked. As the literature the application results of this study showed that 15.5 percent of doctors are trying to be multi-tasked in the emergency services and this means that these places are opened to huge mistakes.

Out of being multitasking, the disruptiveness of some interruptions has been recognized, and different methods have been developed in an attempt to mitigate the deleterious effects of interruptions. Ratwani et al talked about the “interruption-free” zones in their study and this can also be thought in other countries<sup>5</sup>. The doctors watched in this study are trying to manage the interruptions by delaying the interruption cause.

The interruptions and the management of them are mainly related with the work doing at that time and the cause of the interruption. For example, a doctor can delay a phone call during the treatment but he or she should answer to a question of another medical personnel because it also be emergent. The results of this study showed that most of the interruptions have been occurred while the doctor was examining the results of a patient, secondly occurred while the doctor was recording the patient information. It seems that they do not be interrupted while they are with a patient.

It is also seen that the doctors are trying to be multi-tasked but out of this it has seen that they are immediately interested with the interruption. Only few of them have been resumed the interruption cause and continued to their work. The study also showed that the doctors could not be stayed focused after the interruption because more than seventeen percent of them left the work and started to another one.

For increasing the successibility of the emergency services, the interruption management should be done. For an effective management the consciousness of the doctors and the medical personnel, patients and their relatives should be raised. The researches about the subject noticed that the interruption causes are mainly

the other people. For example, according to Raban et al., the medical personnel disturb the other medical personnel while they are working and this causes interruptions<sup>4</sup>. According to Ratwani et al., significantly more interruptions have done by other person ones (87.2% ; 10.9 times per hour; 95% CI 8.5 to 13.3) that stemmed from staff, including other physicians, residents, nurses, and technicians, compared with interruptions from telephone calls (9.2% ; 1.1 times per hour; 95% CI 0.6 to 1.7), patient (1.1% ; 0.2 times per hour; 95% CI 0.0 to 0.2)<sup>5</sup>. As seen out of the medical employees the patients and their relatives are trying to ask questions about their treatment or illness while the doctor is concentrated to another person and the also cause interruptions<sup>2</sup>. Kalisch and Aebersold found that the nurses are always been disturbed too such as emergency service doctors and this shows that the interruptions are not the problem of doctors only<sup>5</sup>.

Unlike the previous similar studies in the literature, our study evaluated whether there was any relationship between the patient’s complaint and the patient and patient-related interruptions. Relatives of traumatized patients were more likely to be associated with interruption. The interruptions were evaluated for the first time in this study according to the intensity of emergency services. It was found that the highest interruptions occurred at the moment when the emergency intensity was 40–60% and the least interruptions were at 20% or less.

Nature of clinical work environments is stressful and most of the medical employees and especially intern doctors sometimes do not know what to do in the emergency situations. They want to exchange information during the treatment but this can cause interruptions for other doctors<sup>6</sup>. The patients are asking for information and they also cause to interruptions. According to the results of this study the interruption causes are frequently the patients as literature and other doctors. The relatives and the patients disturb the doctors while they are working and it is found that their ratio is 21.3; the intern doctors’ is 45.1 and other staff is 22.2 percent.

As a sum, it can be said that the interruptions are one of the basic problems of the emergency services and they are the main factors of medical mistakes. For managing the interruptions, the doctors should never try to be multi-tasked and they should respond the interruption after finishing their work<sup>7</sup>.

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