

THE EVALUATION OF CORRELATION BETWEEN PAIN GRADES AND RE-PRESENTATION RATES OF THE PATIENTS IN EMERGENCY DEPARTMENT

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ABSTRACT

Introduction: Pain complaint comprises the majority of the patient presentations to the emergency department. Temporary symptomatic treatment is applied to the patients presenting to the emergency department for pain complaint. The aim of this study is to determine some of the factors that affect the re-presentation of patients to the emergency department who presented previously for pain complaint.

Material and method: 1021 adult patients who presented to the emergency department for pain complaint were included in the study. Their admission and discharge pain grades were assessed by VAS. The factors affecting the correlation between pain grades and re-presentations were analyzed.

Results: Average admission VAS score of the study patients was 79.2 ± 13.5 mm (scale 20-100) and their average discharge VAS score was 31 ± 19.8 mm (scale 0-100). We observed that age, gender, hour of presentation, pain duration and analgesic usage of patients did not affect their re-presentations. Rate of re-presentation to the emergency department was high for patients suffering from chronic diseases and who present for pain complaint, patients presenting for chest pain and patients to whom drug treatment was applied. We found out that while admission pain grades have no effect on re-presentation, re-presentation rate was high for patients who had high discharge pain grades.

Conclusion: Decreasing the pain grade of the patients who present to the emergency department for pain complaints as far as possible will decrease their re-presentation rates. Therefore, it is important to effectively stop the pain even when the emergency department is busy.

Key words: Emergency department, pain, re-presentation.

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Introduction

Pain as a universal phenomenon is defined as an “unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” by the International Association for the Study of Pain (IASP)⁽¹⁾. Pain emerges due to many distinct causes throughout lifetime and its expression by an individual is influenced by factors including age, gender, underlying disability and social and cultural characteristics related to pain behavior⁽²⁾. Pain has sensory, emotional, behavioral and cognitive components⁽³⁾. Therefore, pain complaints also vary by age and gender^(4,5).

As it is perceived differently in each age and gender, it is also influenced by the sociocultural level of the society^(6,7). A study shows that racial characteristics also have an effect on perception of pain⁽⁸⁾. Thus, patients should be evaluated individually and the severity of pain should be graded.

Considered as a biological reaction associated with tissue damage, pain is also said to have aspects related to genetic, emotional and cultural characteristics, beliefs and individual factors and therefore, although it occurs due to similar physiological causes, pain experience and severity exhibit individual differences^(9,10). Pain frequency is higher in elderly, who have more experience of pain compared to other age groups, in women and in people

who are separated or divorced from their spouses. Pain experience also varies according to the region of residence, different ethnic groups and races. All these evidences indicate that pain is a too complex phenomenon to be explained only by biological causes and that it has sociocultural and psychological aspects as well⁽¹¹⁻¹⁴⁾. Studies report that pain threshold and tolerance for certain pain stimuli can change among genetically different ethnic groups⁽¹⁴⁻¹⁶⁾.

Pain scales are classified as being single or multi-dimensional and being self-assessed or observational. Single-dimensional individual pain methods are grouped into six categories which are Visual Analogue Scale (VAS), Verbal Descriptor Scale (VDS), Numerical Rating Scale (NRS), Face Scale (FS), Analogue Chromatic Continuous Scale (ACCS) and Dermatome Pain Map.

VAS is considered as an appropriate and valid measurement instrument to assess acute pain in emergency departments^(17, 18). With VAS it is possible to measure pain severity grades of the patients. VAS is commonly used in emergency departments. Patients presenting for pain complaint are requested to mark their feeling of pain on a line scaled between 0 mm and 100 mm to help the physician assess their pain. 0 mm corresponds to painless condition where 100 mm indicates an intolerable pain. In this way, pain of the patient can be graded. Studies indicate the sensitivity and specificity of VAS as a pain scale in emergency departments as 95% in measurements⁽¹⁹⁻²¹⁾.

It is important to resolve the pain complaints of the patients in emergency departments and it is equally important to prevent the reoccurrence of the pain as well. The objective of this study is to investigate the correlation between pain grades and re-presentation rates for patients who present to the emergency department for pain complaint and were discharged.

Material and methods

All patients who consecutively presented to the emergency department within 15 days on 24-hour basis and who do not meet the exclusion criteria were included in the prospective, cross-sectional study. During this period 4,820 adult patients presented to the emergency department. 1,021 of these patients (21.2%) who had pain complaints and who met the inclusion criteria at their clinical interviews were included in the study.

Patients who had impaired ability to assess pain, who were suffering post-traumatic pain, who were illiterate, who were admitted in other department due to their acute clinical conditions, who had consciousness and orientation disorders, who were using chronic analgesic medication or those who took analgesic before coming to ER, who needed an emergency medical intervention, who were under 18, who had altered perception of pain due to their chronic illness such as diabetes and neuropathy, who were mentally handicapped and who did not accept to participate in the study were excluded from the study.

All patients were asked about their ages, genders, their comorbid diseases and if they were using analgesics together with questions guiding the diagnosis and treatment of their pain complaints. Start time and localization of the pain were also recorded.

VAS was used to grade the pain of the patients. Patients were informed that VAS is a method used to assess the grade of their pain and that the scale is between 0 mm to 100 mm. The patients were indicated that 0 mm corresponded to painless condition and 100 mm to the maximum possible pain. Before the treatment, as a first step, they were requested to mark their feeling of pain at the time of presenting to the emergency department as a point between 0 mm and 100 mm.

Patients who received pain treatment in the emergency department and who are about to be discharged were asked once again to mark their pain perception on a second VAS scale between 0 mm and 100 mm. The patients were prevented from seeing their previously marked VAS scale during this marking at the time of discharge.

One week after their discharge, patients were called on the phone in their contact information. They were asked if they re-presented to a hospital within this period and the cause for re-presentation.

Data gathered throughout the study were recorded in the SPSS 15.0 statistics software. With respect to the variables which were determined by measurement, t-test was used for the comparison of the average values for parametric variables and Mann-Whitney U test was used to compare non-parametric ones. Regarding the analysis of the data which were obtained by count, chi-square and Fisher's exact test were used. All analysis were performed with 95% confidence interval and p value < 0.05 was accepted as significant.

Results

During the study period 4,820 adult patients presented to the emergency department. 1,021 of these patients (21.2%) who had pain complaints and who met the inclusion criteria at their clinical interviews were included in the study.

Average admission VAS score of the study patients was 79.2±13.5 mm (scale 20-100) and average discharge VAS score was 31± 19.8 mm (scale 0-100).

Average pain duration was 13.2±11.2 hours. Distribution of pain areas is given in Table 1.

Pain area	Number of patients (%)
Extremity	238 (23.3)
Throat pain	216 (21.2)
Head-neck	195 (19.1)
Stomach	179 (17.5)
Chest	108 (10.6)
More than one area	35 (3.4)
Total	1021

Table 1: Pain area distribution of patients presented to the emergency department with pain complaint.

653 of the patients (64%) received medical treatment in the emergency department while 368 of them (36%) did not. 458 of the patients (44.9%) received pain follow-up in the emergency department while 563 of them (55.1%) did not. Consultation was requested for 159 of the patients (15.6%) while this was not requested for 862 patients (84.4%).

The average age of the presenting patients was 45.3±18.0 (scale 18-112). 852 of the patients (83.5%) were under 65 and 169 of them (16.6%) were 65 or over. With respect to age groups, while a statistically significant difference was observed between average admission VAS scores of patients over and under 65, no statistically significant difference was found between average discharge VAS score of these groups (Table 2).

470 of the patients (46%) were male and 551 of the (54%) were female. With respect to gender, we did not find a statistically significant difference between average admission and discharge VAS scores (Table 2).

	Variable	Noun	Means of VAS±SD	P value*	Means of VAS±SD	P value*
Gender of the patient relative	Female	551	79.3±13.1	0.678	31.2±20.2	0.680
	Male	470	78.9±13.8		30.7±19.3	
Senior patient	<65 years old	852	78.8±13.8	0.04	30.9±19.7	0.413
	>64 years old	169	80.8±11.3		31.7±20.0	
History of chronic disease in the patient	No	675	78.9±13.5	0.360	30.2±19.6	0.063
	Yes	346	79.7±13.4		32.6±20.2	
History of analgesic usage	No	837	79.8±13.5	0.361	28.5±19.0	0.018
	Yes	134	76.3±13.0		42.4±19.2	
According to the time of presentation	00:00-07:59	98	79.7±13.9	0.002	30.8±21.7	<0.001
	08:00-15:59	359	80.0±12.8		26.8±18.6	
	16:00-23:59	574	79.1±13.5		31.3±19.0	
Re-presentation to the hospital	No	908	79.1±13.5	0.481	30.1±19.6	<0.001
	Yes	113	80.0±13.5		38.3±20.2	
Re-presentation for the same pain	No	953	79.1±13.4	0.301	30.1±19.6	<0.001
	Yes	68	80.7±12.9		40.3±23.2	

Table 2: Analysis of the presentation and discharge VAS averages of the patients presented to the emergency department.

With respect to the patient distribution by the time of admission; we found that the patients presented most between 16:00-23:59 (56.2%, n=574) which is the time interval after working hours, then between 08:00-15:59 (34.2%, n=349) and the least between 00:00-07:59 (9.6% n=98). A statistically significant difference was observed between average admission and discharge VAS scores of the patients with respect to the time of admission (Annova test, p<0.01).

346 of the patients (33.9%) had one or more chronic diseases. Most common concomitant diseases were hypertension (13.5%), diabetes (5.6%) and COPD (5.3%) respectively. 72 of the patients (7.1%) suffered from more than one chronic disease. We did not observe a statistically significant difference between average admission and discharge VAS scores for the group of patients with an additional disease (Table 2).

837 of the patients (82%) had a history of analgesic usage before presenting to the emergency department. With respect to analgesics usage, admission VAS scores of the study patients were statistically significantly low and their discharge VAS scores were statistically significantly high (Table 2).

In our study, when we examine the patients' admission and discharge VAS scores with regard to admission times, VAS difference score was 53.9 ± 22 mm between 8:00 am - 3:59 pm and this was significantly meaningfully high compared to other time periods.

Data related to the re-presenting patients

113 (11.1%) of the patients re-presented to the emergency service within one week. While there was no statistically significant difference between the average admission VAS scores of the re-presenting patients, there was a statistically significant difference between their average discharge VAS scores (Table 3). Average age of the re-presenting patients was 44.2 ± 18.7 . There was no statistically significant difference between the age distribution of the re-presenting patients (t-test, $p=0.27$). 50 of the re-presenting patients were male and 63 were female. There was no statistically difference between the gender distribution (t-test, $p=0.75$).

	Variable	Noun	VAS difference	P value
Re-presentation	No	908	48.9 ± 23.7	<0.001
	Yes	113	41.7 ± 21.1	
Presentation for the same complaint	No	953	48.6 ± 23.5	0.004
	Yes	68	40.2 ± 22.5	
According to the time of presentation	00:00-07:59	98	48.8 ± 26.0	<0.001
	08:00-15:59	359	53.9 ± 22.7	
	16:00-23:59	574	44.5 ± 22.9	

Table 3: Analysis of VAS differences of re-presenting patients.

The average pain duration was 18.6 ± 12 in their first presentation. There was no statistically significant difference between pain durations (t-test, $p=0.09$). 52 of the patients had at least one additional disease. The re-presentation frequency for the patients with an additional disease was statistically significantly higher than the patients without an additional disease (t-test, $p=0.003$).

86 of the patients had history of drug treatment delivery in the emergency department. The re-presentation frequency for the patients who received drug treatment is statistically significantly higher compared to the patients who did not (t-test, $p=0.005$).

For 66 of the patients, pain follow-up was conducted in the emergency department. The re-presentation frequency for the patients who received pain follow-up is statistically significantly higher compared to the patients who did not (t-test, $p=0.002$).

For 27 of the patients, there was a consultation request from other departments. The re-presentation frequency for the patients with a consultation request is statistically significantly higher compared to the patients without a consultation request (t-test, $p=0.008$).

The average admission VAS score for the patients was 79.8 ± 13.5 mm. There was no statistically significant difference between the patients re-presenting and presenting for the first time in terms of admission VAS scores (t-test, $p=0.48$).

The average discharge VAS score for the patients was 38.2 ± 20 mm. The discharge VAS scores for the re-presenting patients is statistically significantly higher compared to the patients presenting for the first time (t-test, $p<0.001$).

68 of the re-presenting patients (6.7%) had the same complaint. There was no statistically significant difference between the average admission VAS scores of the study patients presenting for the same complaint but there was a statistically significant difference between their average discharge VAS scores (Table 2).

42 (8%) of the patients re-presenting for the same complaint were female and 26 (6%) were male. The average age of the patients was 46.3 ± 18.6 years. The average pain duration of the patients was 25.5 ± 11.2 hours.

31 (9%) of the patients had an additional disease. For the patients with an additional disease, the re-presentation frequency for the same complaint was higher compared to the patients who did not have an additional disease (t-test, $p=0.03$).

Discussion

When we look at the presentation times of the patients included in our study, the emergency department reached the maximum number of patients after the working hours of the hospital. The patients may be presenting at these periods because they can't use polyclinic services or they think they will receive healthcare services in a more convenient way after their working hours. In their study, Gutterman et al. also accepted similar time periods as the periods that maximum number of patients presents with pain complaint⁽²²⁾.

In the study, there was a significant difference in the pain grades of the patients with regard to their presentation times. For the patients presenting during working hours, the pain grades at the time of presentation and the remission grade at the time of discharge was higher compared to other time periods. The reason for preferring the emergency department within working hours when other departments are open may be the higher pain grade. Lower pain grades in patients at the time of discharge within working hours compared to other time periods may be due to the fact that the emergency department is less busy during this period of time and the physician can spend more time.

Considering that the pain complaints of the patients can also be related to chronic diseases and this can have an effect on re-presentation, when we inquired about other diseases, we found that one third of the patients had one or several chronic diseases, primarily hypertension. We can say that these patients with chronic diseases are presenting to the emergency department because their clinical course is continually variable, they feel themselves safe at the hospital or their pain threshold is low. In their study, Song et al. showed that the presence of chronic diseases in the patients presenting to the emergency department changed the pain threshold⁽²³⁾.

When we consider the pain durations of the patients included in the study, we see that they presented with a pain complaint of more than 12 hours on average. Reasons for long pain durations may be that the patients want to avoid the busy emergency services, they wait for elongated periods in the queues in the hospital or they spend some time ignoring the pain.

Even if one can presume that the use of analgesics will reduce presentation frequency, all patients except a minority had history of analgesic use. In a study investigating pain prevalence, Muula AS et al. showed that the patients use analgesics daily even if the pain complaint is not present⁽²⁴⁾. Fox et al. found that the use of analgesics is lower in older patients⁽²⁵⁾.

When we looked at the pain areas in this study, we found that most frequent pain was extremity pain. When Suka et al. investigated musculoskeletal system pain they also reported neck and extremity pain as a more frequent reason of pain compared to other sites⁽²⁶⁾.

The study patients marked their pain grades as close to intolerable on average during their presen-

tation. In addition to different pain threshold of each patient, it is possible that they used these marks to show the urgency of their condition or to get priority after being informed. The patients were discharged with mild pain grade on average. With a low number of patients whose pain totally stopped, in the clinical studies using VAS, the change required for the patients to express and qualify the pain as "little less" or "little more" corresponded to 13 mm⁽²⁷⁻²⁹⁾. So, it can be suggested that the patients can't express their pain when there is not much change in their pain.

The number of patients re-presenting after the discharge comprised a small part of the whole group. It can be accepted that the patients did not re-present after the discharge because their complaints were substantially resolved in the emergency department, they were diagnosed and their treatment was completed. However, from time to time, too many patients presentation can cause inadequacies in the temporary treatment of the patients.

Among the re-presenting patients, the number of presentations by female patients was higher compared to male patients but there was no significant difference. However, in their study, McCaig LF et al. found that female patients had lower pain suppression threshold⁽³⁰⁾.

In the study, we found that there was no correlation between the patient's age and re-presentations. This may be due to the fact that the majority of patients who re-presented were below 65. In their study, Akyüz G et al. found that the pain transmission in patients over 65 was variable⁽³¹⁾.

In the study, we found that initial presentation time did not influence re-presentation. Delivery of adequate diagnosis and treatment even in the periods when the emergency departments are busy and it is hard to intervene to the patient prevented the re-presentation of the patients.

In our study, we found that the presence of chronic disease raised the re-presentation frequency of the patients. This may be because the clinical course of the patients with chronic disease is continually variable, they are used to coming to the hospital because of their chronic disease or as Song et al. found, chronic diseases change the pain threshold⁽²³⁾.

In our study, the patients presented most frequently with extremity pain and chest pain was the most frequent reason for re-presentation. As ischemic heart disease is a constant cause of fear

for people, it is possible to say that this is caused by the fact that people feel themselves safer when they present to the hospital.

The fact that the patients who received analgesic treatment or pain follow-up in the emergency department re-presented more frequently may be interpreted as the perception of the disease as more serious. In their study, Sharp et al. report that as the patients stay longer in the emergency department, they believe their disease is more serious⁽³²⁾.

The pain grade of the patients at the time of admission did not have an effect on re-presentation. But the re-presentation rate was found to be higher in patients who did not have sufficient decrease in their pain grade. In our study, discharges with high pain grades increased re-presentations. When the patients are discharged without sufficient level of decrease in their pain, they may think that they are not correctly diagnosed or did not receive adequate treatment. Therefore, the pain grade at the time of discharge is important in the patient's representation. So the patient who present to the emergency department with pain complaint should be discharged with completely or substantially alleviated pain as far as possible.

When we look at the average pain grades decreased in the emergency departments, although it is less for the female patients, no difference in gender distribution was found. The reason for this may be the higher severity of pain, harder pain treatment and as in the study by McCaig et al. higher pain suppression threshold in female patients⁽³⁰⁾.

Conclusion

In our study, we found that re-presentations of patients with pain complaint were independent from age, gender, presentation time, pain duration and analgesic usage. Rate of re-presentation to the emergency department was high for patients with chronic diseases and who present for pain complaint, patients presenting for chest pain and patients to whom drug treatment was applied.

When we look at the effect of patients' pain grades on re-presentation, we found that the pain grade at first presentation did not have an effect on re-presentation while the patients who had high pain grade at the time of discharge had higher re-presentation rates.

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