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Klinik Çalışma

Triage decisions of emergency physicians in Kocaeli and the principle of justice

Kocaeli ili acil hekimlerinin triyaj kararları ve adalet

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BACKGROUND

We aimed to examine the accuracy of triage decision-making among emergency physicians, using a multiple casualty scenario. This will assist in determining the necessity of triage training, which is the foundation of emergency medical ethics.

METHODS

A self-administered questionnaire including a multiple casualty scenario requiring each casualty to be prioritized for treatments by Simple Triage and Rapid Treatment (START) was given to 110 emergency physicians working at pre-hospital and hospital emergency services in Kocaeli. The differences between personal/professional characteristics and triage decisions were analyzed using chi-square test.

RESULTS

Accurate triage decision rates of the emergency physicians ranged from 83.6% to 90.0% for four immediate casualties, 26.4% to 78.2% for seven urgent casualties, 70.9% to 91.8% for four delayed casualties, and 82.7% to 97.3% for two dead cases. Personal and professional characteristics were found to be statistically significant in five cases ($p<0.05$).

CONCLUSION

This study showed that emergency physicians tended to under-triage patients. This result and the discrepancy of the accuracy rates in urgent casualties revealed the necessity for improvement in medical-ethical decision-making in the training programs. This improvement will help in reducing violation of the important duties of justice and of do no harm by the emergency physicians.

Key Words: Clinical ethics; principle of justice; pre-hospital triage; START.

AMAÇ

Bir çoklu yaralanma senaryosu kullanarak acil hekimlerinin triyaj karar verme yeterliklerini değerlendirmek ve acil tıp etiğinin temelinde yer alan triyaj eğitimi ihtiyacını belirlemektir.

GEREÇ VE YÖNTEM

Kocaeli ili hastane ve hastane öncesi acil servislerde çalışan 110 acil hekimine *Simple Triage and Rapid Treatment* (START) algoritmasına göre triyaj uygulayacakları 17 olguluk bir çoklu yaralanma senaryosu içeren anket formu dağıtıldı. Kişisel ve profesyonel özellikler ile triyaj kararları arasındaki farkı belirleyebilmek için ki-kare testi kullanıldı.

BULGULAR

Acil hekimlerinin doğru triyaj karar oranları, birinci öncelikteki dört yaralı için %83,6 ile %90,0, ikinci öncelikteki yedi yaralı için %26,4 ile %78,2, üçüncü öncelikteki dört yaralı için %70,9 ile %91,8 ve ölü olan iki olgu için %82,7 ile %97,3 arasında değişmekte idi. Kişisel ve profesyonel özellikler (yaş, mesleki deneyim, hastane acil deneyimi ve hastane öncesi acil deneyimi) beş yaralı için istatistiksel açıdan anlamlı bulundu ($p<0,05$).

SONUÇ

Çalışmamız acil hekimlerinin yaralılar için yetersiz triyaj kararı verme eğilimde olduğunu göstermiştir. Bu sonuç ve ikinci öncelikteki yaralılar için verilen doğru triyaj kararlarındaki sapma eğitim programlarında klinik-etik karar verme yöntemlerinin geliştirilmesi gerektiğini göstermektedir. Böylece acil hekimlerinin önemli etik ödevlerinden olan adalet ve zarar vermeme ödevlerinin ihlal edilmesi önlenebilecektir.

Anahtar Sözcükler: Klinik etik; adalet ilkesi; hastane öncesi triyaj; START.

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Triage decisions carry a major importance in allocating scarce medical resources, such as in multiple casualty incidents (MCI). Triage is derived from the French word trier, which means to choose among several.[1-4] In medicine, triage means classifying patients based on their medical condition with the overall objective of "to do the greatest good for the greatest number". Although debates on the ethics of triage remain,[4,5] triage facilitates fulfillment of the duty of justice, which requires "equals should be treated equally and unequals unequally in proportion to the relevant inequalities" by the principle of formal distributive justice.[4-6] According to this principle, it is important to determine appropriate similarities and differences. Therefore, different triage algorithms are being developed for different circumstances (e.g. pre-hospital emergency, intensive care, disaster, etc).[1,3,4] For pre-hospital emergency services, several algorithms have been suggested, such as Simple Triage and Rapid Treatment (START); Circulation, Respiration, Abdomen, Motor, and Speech (CRAMS); and Triage Sieve, in which walking, respiration, and circulation of the patients are evaluated.[3,7-9]

The accurate triage application is important not only for the duty of justice but also for the duties of beneficence and do no harm based on the principles of medical ethics.[6,10-12] Equity and efficiency of allocating emergency services are increased using standard triage algorithms; however, inaccurate triage decisions may still occur.[13] These inaccurate decisions are expected to be in a range of acceptable limits. Under-triage should be below 5% and over-triage should be below 50% as suggested by the Canadian Association of Emergency Physicians (CAEP).[14,15]

Turkey's population is over 70 million, and in the last four years, over 3000 people died and over 100,000 people were injured annually.[16,17] Fifty percent of the deaths in traffic accidents occur within the first 30 minutes, and it has been pointed out that an efficient emergency management could prevent 20 to 25% of these deaths.[18] Therefore, "to conduct the emergency medical services equally, accessibly, fast and efficiently in the whole country", the Code of Emergency Health Care Services was passed in 2000, and updated in 2004.[19,20] Pre-hospital triage is an important factor for efficient emergency management. For this reason, a triage definition was added in this Code, which obliges the first pre-hospital emergency physician (EP) who reaches the event scene to become the triage officer.[20]

Although the START algorithm was primarily developed for use by the community emergency response team and firemen, in Turkey, EPs* are trained with the START algorithm in an Emergency Physician Certification Program.[21-23] However, there are only a few studies about the accuracy of triage decision-making of trained EPs using the START algorithm. We performed this study in the city of Kocaeli, which ranks fifth in traffic accidents in Turkey.[24] In this city in 2006, 25% of annual emergency patients were trauma victims, and interventions in 19.5% of them were performed at the event scene.[25] Kocaeli is situated on the North Anatolian Fault Zone and the international roads of D-100 and Trans-European Motorway.[26] Therefore, the efficacy of triage management carries a major importance for the regional health care system and medical ethics.

As a result, we aimed in this study to determine the accuracy of theoretical triage decision-making based on the START algorithm and the necessity of triage training among the pre-hospital and hospital EPs of Kocaeli, who must perform triage in MCIs. We evaluate these decisions in light of the obligation of upholding the duty of justice.

MATERIALS AND METHODS

The Health Authority of Kocaeli District conducted the Basic Training Module of EPs Certificate Program. One hundred and twenty-eight physicians who were working in emergency departments of all state hospitals and all pre-hospital emergency services (9 hospitals and 12 stations) in Kocaeli participated in this program. The program also included START and emergency medical ethics as well as emergency medical interventions. Between April and October 2005, the EPs trained for five days (30 hours). The questionnaire of the current study was applied to the groups on the final day before the examination.

Methods of Measurement: The scenario used for the study was adapted from Kilner[15] with permission. However, three of the 20 cases were excluded because of insufficient information to identify a priority using the START algorithm. The remaining patient scenarios consisted of 4 immediate, 7 urgent, and 4 delayed casualties and 2 dead cases.

In addition to providing demographic information and details of professional, pre-hospital and hospital emergency experience, subjects were required to assign a priority for treatment from one of four possibilities using the START algorithm as *"Priority 1 (immediate)", "Priority 2 (urgent)", "Priority 3 (delayed)",* or *"No priority (dead)"* based upon the descriptor for each case.

Data analyses were carried out using the statistical package SPSS 12.0 for Windows. The demographic and professional characteristics of the EPs were used as independent variables and the relationship with the triage decisions was analyzed by Pearson chi-square test. P values less than 0.05 were considered significant.

Table 1. Characteristics of emergency physicians (N=110)

Characteristics	%	n
Sex		
Male	69.1	76
Female	30.9	34
Age		
≤35 years	51.8	57
>35 years	48.2	53
Professional experience		
≤5 years	31.8	35
6-10 years	27.3	30
>10 years	40.9	45
Pre-hospital emergency experience		
Yes	76.4	84
Hospital emergency experience		
Yes	73.6	81
Multiple-casualty or disaster experience		
Yes	59.1	65

This study was approved by Kocaeli University Human Research Ethics Committee on May 7, 2003.

RESULTS

Since 18 physicians did not attend the lecture, the questionnaire was not presented to them. Of 128 EPs in Kocaeli, 110 EPs (86% response rate) participated in this study. The mean age of the physicians was 35.6±5.3 years. Pre-hospital emergency experience of the physicians was less than 5 years in 55.5% (n=61) (Table 1).

The differences between accuracy of triage decisions and sex, having pre-hospital emergency experience and having disaster or multiple casualty experience among the physicians were not found to be statistically significant. However, accuracy of triage decisions was influenced by age, duration of pre-hospital emergency experience, having hospital emergency experience, and duration of professional experience of the physicians on particular patient scenarios, as indicated in Tables 2 and 3.

The triage decisions were sorted according to priority of the patient scenarios:

"Priority 1" (immediate) casualties: The majority of the EPs triaged these four casualties accurately; the range of the inaccurate triage decisions was 10%-16.4% (Table 2). Most of the inaccurate decisions were *"Priority 2"* and a few of them were *"dead"*.

Age and pre-hospital emergency experience of the EPs affected the accuracy of triage decisions for Patient 11. While almost all physicians (96.5%) younger than 36 years triaged this patient accurately, the rate among older physicians for accurate decisions for this patient was 71.7%. Nearly one-fourth (22.6%) of older physicians triaged this patient as *"Priority 2"* and 5.7% of them triaged as *"Priority 3"*. In contrast, only 3.5% of younger physicians triaged this patient as *"Priority 2"* and none of them triaged her as *"Priority 3"*.

"Priority 2" (urgent) casualties: The EPs triaged *"Priority 2"* casualties less accurately than in the case of the immediate casualties. Moreover, there was a high deviation rate for the accurate decisions. Most of the EPs triaged the patients numbered 3, 4, 8, 10 and 14 accurately (70-78.2%). Under-triage decisions for Patients 2 and 12 were determined as 73.6% and 47.3%. There were fewer over-triage decisions for "Priority 2" casualties than under-triage decisions (Table 3).

Duration of professional experience of the physicians significantly affected the decisions for Patients 2 and 14 (Table 3). Physicians with professional experience of less than 5 years triaged both of these casualties more accurately. Having hospital emergency experience adversely affected accurate triage decisions for Patient 3. There was a statistically significant relationship between age and the decisions about Patient

Table 2. Triage decisions of emergency physicians for the *"Priority 1"* (immediate) casualties (N=110)

Patient's condition	Accurate triage decisions (P1) n (%)	Under- triage decisions (P2,P3,EX) n (%)	P*
Patient 5. 28-year-old female, unresponsive, blood from nose and right ear, noisy respiration at a rate of 30, pulse 100	99 (90.0)	11 (10.0)	NS
Patient 7. 55-year-old male, conscious, sucking chest wound, respiratory rate 32, pulse 120	95 (86.4)	15 (13.6)	NS
Patient 11. 22-year-old female, conscious, paradoxical respiration, respiratory rate 32, pulse 100, remains in vehicle, but is not trapped	93 (84.5)	17 (15.5)	Age: p<.001 Pre-hospital emergency experience: p=.020
Patient 13. 52-year-old male, unresponsive, respiratory rate 8, pulse 100	92 (83.6)	18 (16.4)	NS

Only statistically significant values are shown in Tables; NS: Non-significant.

Table 3. Triage decisions of emergency physicians for the *"Priority 2"* (urgent) casualties (N=110)

Patient's condition	Accurate triage decisions (P2) n (%)	Over- triage decisions (P1) n (%)	Under- triage decisions (P3) n (%)	P*
Patient 3. 35-year-old female, conscious, bilateral fractured femurs, respiratory rate 22, pulse 115	86 (78.2)	8 (7.3)	16 (14.5)	Hospital emergency experience p=.023
Patient 8. 35-year-old male, conscious, multiple fractures, respiratory rate 28, pulse 130, remains trapped in the vehicle	81 (73.6)	20 (18.2)	9 (8.2)	Age: p=.029
Patient 4. 30-year-old female, conscious, severe bruising to chest, unable to move because of the pain, respiratory rate 28, pulse 100, remains in the vehicle	79 (71.8)	19 (17.3)	12 (10.9)	NS
Patient 10. 20-year-old male, conscious, in considerable pain, fractured tibia and fibula, respiratory rate 18, pulse 90, remains trapped in vehicle	77 (70.0)	5 (4.5)	28 (25.5)	NS
Patient 14. 45-year-old male, conscious, multiple lacerations, unable to move from his current position laying on the floor, no sensation in the lower extremities, respiratory rate 18, pulse 110	77 (70.0)	21 (19.1)	12 (10.9)	Professional experience p=.045
Patient 12. 30-year-old female, conscious, scalp laceration, respiratory rate 20, pulse 90, unable to get out of the vehicle because of tangled wreckage and trapped casualties	56 (50.9)	2 (1.8)	52 (47.3)	NS
Patient 2. 32-year-old male, conscious, fractured radius and ulna, multiple lacerations, respiratory rate 20, pulse 90. He has made his way from the vehicle and is sitting at the roadside	29 (26.4)	–	81 (73.6)	Professional experience p=.048

Only statistically significant values are shown in Tables; NS: Non-significant.

8 (Table 3). The physicians older than 35 years triaged the casualties less accurately.

"Priority 3" (delayed) casualties: Most of the physicians triaged the casualties accurately (70.9%-91.8%). The majority of the over-triage decisions were *"Priority 2"*, while the average rate of *"Priority 1"* decisions was 5.9% (Table 4).

"Dead" cases: The most accurate triage decisions of the physicians were for the dead cases. However, 17.3% of the physicians evaluated Patient 1 as a "Priority 1" casualty (Table 5).

Limitations of the study are that the participants made triage decisions on patient scenarios and that the questionnaire of this study was applied just before the certification program examination. Therefore, the scale of the decisions may not reflect the real conditions that physicians encounter in their daily practice.

DISCUSSION

In the present study, the patient scenarios were grouped according to priority of the casualties, and we assessed the triage decisions of the participants in this manner. We evaluated the decisions based on the suggestions of CAEP.[14,15]

When a patient is under-triaged and does not receive the medical intervention on time, the patient is harmed, loses the benefit and can not take advantage of resources equally. *"Priority 2, 3"* or *"dead"* decisions for the casualties whose intervention should not be delayed result in vital and irreversible risks. By means of the principles of bioethics, under-triage decisions that might harm the patients suggest that the duties of do no harm, beneficence and justice could be violated by EPs.[10,27]

In the current study, all under-triage decisions (10%-16%) in *"Priority 1"* casualties were higher than the suggested limits of CAEP. Moreover, even though few in number, Patients 5 and 13 were evaluated as "dead" (Table 2). However, EPs with fewer than six years of pre-hospital emergency experience triaged Patient 11 more accurately. The higher inaccurate decision rate of the more experienced physicians

Table 4. Triage decisions of emergency physicians for the *"Priority 3"* (delayed) casualties (N=110)

Patient's condition	Accurate triage decisions (P3) n (%)	Under- triage decisions (P1 & P2) n (%)	P*
Patient 9. 50-year-old female, wandering around in a distressed state, uncooperative – unable to determine respiratory rate or pulse	101 (91.8)	9 (8.2)	NS
Patient 17. 15-year-old male, trying to help other casualties, multiple lacerations, bruising to chest, respiratory rate 20, pulse 110	99 (90.0)	11 (10.0)	NS
Patient 6. 8-year-old male, very distressed, lacerations to head, respiratory rate 26, pulse 90, rushing between patient 2 and patient 5	92 (83.6)	18 (16.4)	NS
Patient 16. 30-year-old male, blood leaking from nose and ears, restless and disorientated, wandering about, respiratory rate 18, pulse 90	78 (70.9)	32 (29.1)	NS

NS: Non-significant.

about *"Priority 1"* casualties could be a result of their distrust of START.

We observed the highest deviation from accurate triage decisions in *"Priority 2"* casualty scenarios. For these urgent casualties, the over-triage rates varied between 1.8% and 19.1%, while under-triage rates varied between 8.2% and 73.6%. All under-triage decisions exceeded the limits of CAEP.

Kilner (2002) evaluated the Triage Sieve Algorithm in two studies and found that of 233 emergency health care providers, more than half of the participants made under-triage decisions for two urgent casualties.[15] In the subsequent study in which Kilner et al.[28] (2005) aimed to determine the effect of printed decision-support materials on triage decision-making, they showed that inaccurate under-triage decisions decreased after using decision-support materials in 82 police firearms officers. In 2006, we also reported that under-triage decisions could be reduced by triage training of the 64 pre-hospital emergency providers.[18]

Most of the physicians triaged the *"Priority 3"* casualties accurately (70.9%-91.8%) (Table 4). In a majority of the over-triage decisions, the casualties were assessed as *"Priority 2"* (urgent) patients. However, the average rate of the over-triage decisions that evaluated the casualties as *"Priority 1"* was 5.9%. The over-triage decisions rate for the *"Priority 3"* casualties did not exceed the rates suggested by CAEP. The EPs likely used a degree of clinical judgment and upgraded the patients based on suspicion of other potentially life-threatening problems. This raises the question of the reliability of the START algorithm for the *"Priority 3"* patients.

Physicians of the current study triaged *"dead"* cases accurately (83%-97%), and the over-triage decisions for these cases did not exceed the limits of CAEP. Kilner[15] (2002) found that the over-triage rates could be quite high for the "dead" cases, and Kilner et al.[28] (2005) showed that misevaluation rates decreased using written triage tools.

Table 5. Triage decisions for the *"dead"* cases (N=110)

Patient's condition	Accurate triage decisions (EX) n (%)	Over-triage decisions (P1) n (%)	P*
Patient 15. 20-year-old female, no apparent injuries, unresponsive, placed in recovery position by a member of the public, no breathing, no pulse	107 (97.3)	3 (2.7)	NS
Patient 1. 40-year-old male, unresponsive, no breathing, pulse 120, compound fractured femur. His airway has been opened and he has been placed in the recovery position by a member of the public	91 (82.7)	19 (17.3)	NS

NS: Non-significant.

In our previous study, in which pre-hospital emergency providers who did not have training were also included, the over-triage decision rate for dead cases was 42.2%.[18] More accurate results were obtained in this study because we conducted the current study only with EPs who had received triage training.

Some other studies also concluded that accurate triage decisions were increased with triage training. Chen et al.[14] reported that the 56% accurate triage rate improved to 88% after START training in 30 health care professionals. Similarly, Risavi et al.[29] showed that triage ability was improved dramatically after a single didactic START intervention, and improvement persisted over a month in 109 pre-hospital providers. However, Billittier et al.[30] reported that provider experience and level of certification did not influence the critical patient-care decisions in 311 out-of-hospital emergency health care providers.

In the current study, the over-triage decisions for the casualties were within acceptable limits. Unfortunately, all of the under-triage decisions, especially for *"Priority 1"* (immediate) casualties, were found to be unacceptable. Under-triage decisions are a direct violation of the principles and the duties of do no harm, beneficence, justice, and the duty of fair distribution of emergency medical recourses. However, over-triage decisions indirectly cause violation of these principles and duties. Because the duty of justice requires that "equals must be treated equally", the differences in the decisions could threaten this duty.[6]

Indeed, even if use of a standard technique avoids arbitrary decisions and facilitates the fair distribution of emergency medical resources, studies about the efficiency of the triage algorithms remain insufficient.[9,15]

The tendency of EPs to under-triage and the high disparity of the accuracy rate for the urgent casualties manifest the importance of START training. Interestingly, we observed that all fields of experience (professional, emergency and pre-hospital emergency) appeared to affect the accuracy of triage decisions negatively. If the proposed algorithm for an incident is START, our study showed that personal experience could overcome the triage rules. Therefore, it must be emphasized that the medical-ethical decision-making ability should also be increased.

Over-triage decisions for the cases with no hope of recovery result in wasting limited medical resources and may endanger the lives of those with less severe injuries. In a retrospective study, Frykberg et al.[31] reported that over-triage could result in loss of potentially salvageable lives. It is therefore important that triage officers understand the triage system they employ and the moral values and principles upon which it is based. If triage officers do not understand the ethical basis for their decisions, they may be indecisive.[5,32]

Consequently, the EPs who are expected to have adequate knowledge and skills on triage techniques seem to violate their duties of justice, do no harm and beneficence indirectly by over-triage decisions and directly by under-triage decisions. In order to prevent the breaching of these duties, pre-hospital and hospital EPs should be periodically trained on triage techniques and improve their ability on medical-ethical decision-making. In addition, because of the suspicion that physicians mistrust the START technique, retrospective and prospective studies should be planned in order to determine the efficiency of the START algorithm on the outcome of casualties.

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REFERENCES

1. Iserson KV, Moskop JC. Triage in medicine, part I: Concept, history, and types. Ann Emerg Med 2007;49:275-81.
2. Repine TB, Lisagor P, Cohen DJ. The dynamics and ethics of triage: rationing care in hard times. Mil Med 2005;170:505-9.
3. Lanoix R, Wiener DE, Zayas VD. Concepts in disaster triage in the wake of the World Trade Center terrorist attack. Top Emerg Med 2002;24:60-71.
4. Bogaert KD. The quandaries of the principle of triage. SA Fam Pract 2005;47(2): 47-49 Available at: http://www.e-doc.co.za/modules.php?name=New&file=article&sid=847, (Accessed: June 01, 2007).
5. Moskop JC, Iserson KV. Triage in medicine, part II: Underlying values and principles. Ann Emerg Med 2007;49:282-7.
6. Akpınar A. Yoğun Bakım Ünitelerinde Çalışan Hekim ve Hemşirelerin Yoğun Bakım Kaynaklarını Paylaştırmakla İlgili Tutum ve Görüşleri ile Çağdaş Adalet Kuramlarının İlişkisi [The Correlation between Attitudes of Intensive Care Physicians and Nurses towards Allocation of Intensive Care Resources and Contemporary Theories of Justice]. (Master's thesis in Turkish) Kocaeli, Türkiye: Kocaeli University, Institute of Health Sciences; 2005. Chapter 2.3, Justice Concept: Definition and types; p. 3-11.
7. The Medical Algorithms Project: Chapter 29. Trauma & Emergency Medicine. Section: Triage of the Trauma Patient. Available at: http://www.medal.org/visitor/www/inactive/ch29.aspx, (Accessed: October 08, 2006).
8. Báez AA, Lane PL, Sorondo B. System compliance with out-of-hospital trauma triage criteria. J Trauma 2003;54:344-51.
9. Garner A, Lee A, Harrison K, Schultz CH. Comparative analysis of multiple-casualty incident triage algorithms. Ann Emerg Med 2001;38:541-8.
10. Beauchamp TL, Childress JF. Principles of biomedical ethics. 5th ed. New York: Oxford University Press Inc; 2001. p. 264-72.
11. Beauchamp TL. Philosophical ethics: an introduction to moral philosophy. 2nd ed. USA: McGraw-Hill Inc; 1991. p. 340-82.
12. American College of Emergency Physicians Board of Directors. Code of Ethics for Emergency Physicians. June 1997.

American College of Emergency Physicians Web site. Available at: http://www.acep.org/webportal/PracticeResources/PolicyStatements/ethics/codeethics.htm, (Accessed: January 23, 2007).
13. Nocera A, Garner A. An Australian mass casualty incident triage system for the future based upon triage mistakes of the past: the Homebush Triage Standard. Aust N Z J Surg 1999;69:603-8.
14. Chen KC, Chen CC, Wang TL. The role tabletop exercise using START in improving triage ability in disaster medical assistance team. Annals of Disaster Medicine 2003;1(2):78-84. Available at: http://www.disaster.org.tw/english/suppl2/topmenu.htm, (Accessed: January 23, 2007).
15. Kilner T. Triage decisions of prehospital emergency health care providers, using a multiple casualty scenario paper exercise. Emerg Med J 2002;19:348-53.
16. Türkiye İstatistik Kurumu Haber Bülteni 2009;14. [Turkish Statistics Institute News Report], (news report in Turkish). Available at: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=3992, (Accessed: February 02, 2009).
17. Emniyet Genel Müdürlüğü. Genel Kaza İstatistikleri. [Turkish Directorate General of Security. Road accidents statistics], (annual statistics in Turkish). Available at: http://www.trafik.gov.tr, (Accessed: February 02, 2009).
18. Ersoy N, Bağdaçiçek S, Akpınar A. Kocaeli ili 112 acil çalışanlarının bir çoklu yaralanma senaryosu için triyaj kararları. [Triage decisions of Kocaeli 112 emergency health care providers, using a multiple casualty scenario], [Article in Turkish] Turk J Emerg Med 2006;6:69-75.
19. The Ministry of Health of Türkiye. General Directorate of Primary Health Care: [The Code of Emergency Health Care Services] (legal regulation in Turkish). Date and number: May 11th, 2000; 24046.
20. The Ministry of Health of Türkiye. General Directorate of Primary Health Care: [The Code of Emergency Health Care Services], (Legal regulation in Turkish). Date and number: March 24th, 2004; 25412.
21. Wikipedia, the free encyclopedia. 'Triage'. Available at: http://en.wikipedia.org/wiki/Triage#S.T.A.R.T_model, (Accessed February 02, 2009).
22. The Ministry of Health of Türkiye. Emergency Medicine Certificate Program Application Directive, (legal regulation in Turkish). Date and number: January 23rd, 2004; 717.
23. Kocaeli Sağlık Müdürlüğü Acil Sağlık Hizmetleri Şubesi. Acil Hekimliği Sertifika Programı. [Health Authority of Kocaeli District Directorate of Emergency Health Care Service, Emergency Physicians Certificate Program], 2005.
24. Türkiye İstatistik Kurumu. 2007 Türkiye İstatistik Yıllığı. [Turkey's Statistical Yearbook 2007], p. 233. Available at: http://www.tuik.gov.tr/yillik/yillik.pdf, (Accessed February 02, 2009).
25. Kocaeli İl Sağlık Müdürlüğü Acil Sağlık Hizmetleri Şubesi. 2006 Yılı Kocaeli Acil Sağlık Hizmetleri İstatistikleri. [Health Authority of Kocaeli District Directorate of Emergency Health Care Service, The City of Kocaeli Statistics of Emergency Health Care Services in the Year 2006], (annual statistics in Turkish). Available at: http://www.kocaelism.gov.tr, (Accessed: April 24, 2007).
26. Kocaeli Valiliği. Kocaeli İl Çevre Durum Raporu, 2006. [Governorship of Kocaeli. Report of District Environmental Condition]. Available at: www.cedgm.gov.tr/icd_raporlari/kocaeliicd2006.pdf, (Accessed: February 02, 2009).
27. Jonsen AR, Siegler M, Winslade WJ. Clinical ethics. 3rd ed. New York: McGraw-Hill Inc; 1992. p. 142-4.
28. Kilner T, Hall FJ. Triage decisions of United Kingdom police firearms officers using a multiple-casualty scenario paper exercise. Prehosp Disaster Med 2005;20:40-6.
29. Risavi BL, Salen PN, Heller MB, Arcona S. A two-hour intervention using START improves prehospital triage of mass casualty incidents. Prehosp Emerg Care 2001;5:197-9.
30. Billittier AJ, Lerner EB, Moscati RM, Young G. Triage, transportation, and destination decisions by out-of-hospital emergency care providers. Prehosp Disaster Med 1998;13:22-7.
31. Frykberg ER, Tepas JJ 3rd. Terrorist bombings. Lessons learned from Belfast to Beirut. Ann Surg 1988;208:569-76.
32. Kennedy K, Aghababian RV, Gans L, Lewis CP. Triage: techniques and applications in decision making. Ann Emerg Med 1996;28:136-44.

Page 204, * : *In this text, "emergency physicians" refer to general practitioners graduated from medical school and working in pre-hospital emergency services or emergency departments of state hospitals.*