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# Outcomes of Burn Management at the Primary Care: Social and Economical Aspects

## Birinci Basamakta Yanık Tedavisinin Sonuçları: Sosyal ve Ekonomik Yönler

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**Abstract**

Family physicians are supposed to be the first to face with patients at the acute or chronic terms of the illnesses as a primary care facility. In burn injuries, however, patients mostly seek medical attention at the health facilities other than the family physicians. We aimed to analyze the current situation in our country and its social and economic outcomes. Between July 1st and august 31st 2012, among 153 patients admitted to our burns outpatient clinic, 119 were included to the study. Twenty-one patients' family physicians and 21 family physicians not related to our study group were randomly sampled. Patient demographics, clinical course, and treatment cost were recorded. Patients' selection criterion in between primary care and us (tertiary referral hospital) is evaluated by a questionnaire. A survey carried out among family physicians to evaluate their backgrounds on burn management and attendance to postgraduate courses. The male to female ratio of the patients was 1.25 (66/55) and mean age was 29±18.1. Of the patients, 95% reached the hospital with a vehicle and 70.6% had an accompanier. Only 13.4% of the patients sought medical attention at the primary care. 52.4% (22/42) of the family physicians did never attend to a postgraduate course. During the prospective follow-up, there necessitated 501 visits and dressing changes. Total treatment cost for an average course was 109.4 $ or 26 $ for a visit. If the treatments were done at the primary care, a 42.2% reduction at costs could have been achieved. Even mostly conditions appropriate for management at the primary care, burn patients mostly bypass this stage. In addition, family physicians are not well updated on the current burn wound care. Bypassing the primary care add an extra physical, psychological, social, and economic burden to patient and also leads extra workload to the related health facilities. Bypassing causes additional economical cost to patients and insurance agencies. Policies should be settled for the management of outpatient burn patients at the primary care.

Keywords: Primary care, Family Physician, Burn, Cost.

**Özet**

Akut veya kronik dönemlerinde hastalarla ilk karşılaşanların birinci basamak sağlık kuruluşlarındaki aile hekimleri olması gerekir. Yanık durumlarında ise hastalar çoğunlukla aile hekimleri dışındaki sağlık kuruluşlarına başvurmaktadır. Bu çalışmada ülkemizdeki mevcut durumu ve bunun sosyal ve ekonomik

sonuçlarını analiz etmeyi amaçladık. 1 Temmuz-31 Ağustos 2012 tarihleri arasında yanık polikliniğimize başvuran 153 hastadan 119'u çalışmaya dahil edildi. Çalışmamıza katılan 21 hastanın aile hekimi ve kontrol grubu olarak da çalışmamızla ilişkili olmayan 21 aile hekimi rastgele örneklemle alındı. Hasta demografisi, klinik seyri ve tedavi maliyetleri kaydedildi. Hastaların bizi (üçüncü basamak sevk hastanesi) ve birinci basamağı seçme kriterleri bir anket ile değerlendirildi. Aile hekimleri arasında yanık yönetimi ve mezuniyet sonrası kurslara devam etme konusundaki geçmişlerini değerlendirmek için bir anket yapıldı. Hastaların erkek-kadın oranı 1.25 (66/55), yaş ortalaması 29±18.1 idi. Hastaların %95'i araçla, %70.6'sı refakatçi ile hastaneye ulaşmıştı ve sadece %13.4'ü birinci basamakta tıbbi yardım istemişti. Aile hekimlerinin %52.4'ü (22/42) mezuniyet sonrası hiç eğitim almamıştı. Prospektif izlem süresince 501 hasta ziyareti ve pansuman değişikliği gerekti. Ortalama bir kür için toplam tedavi maliyeti 109.4 $ veya bir ziyaret için 26 $ idi. Tedaviler birinci basamakta yapılsaydı, maliyetlerde %42.2'lik bir azalma sağlanabilirdi. Birinci basamakta tedavi için koşullar çoğunlukla uygun olsa bile, yanık hastaları genellikle bu aşamayı atlarlar. Bunun yanında aile hekimleri mevcut yanık yarası bakımı konusunda yeterince güncel bilgiye sahip değildir. Birinci basamak sağlık hizmetinin atlanması hastaya ekstra fiziksel, psikolojik, sosyal ve ekonomik yük getirmekte ve ayrıca ilgili sağlık kuruluşlarına ekstra iş yükü getirmektedir. Bypass, hastalara ve sigorta acentelerine ekstra ekonomik maliyete neden olmaktadır. Birinci basamakta ayaktan yanık hastalarının yönetimi için politikalar belirlenmelidir.

Anahtar Kelimeler: Birinci basamak, Aile hekimi, Yanık, Maliyet.

## Introduction

The World Organization of Family Doctors (WONCA) and Turkish Ministry of Health Public Health Agency defines family physician as the first contact point of the patient and manages simultaneously both acute and chronic health problems of individual patients [1,2]. Though definition is accepted in Turkey, their practical reflections do not cover its definition in some health issues. Burn prevention and management is among the issues should be focused from family medicine's perspective. It is a worldwide well known issue that most of the burns occur at childhood and most of them are preventable [3].

Burn is a devastating trauma with its occurrence and consequences; however, it is classified as minor, moderate and major burns which require different treatment strategies and hospitalization criterion however wound management for superficial minor burns is almost unique. Of the patients admitted to a burn facility with burn injury, approximately 95% are fit the criterion for outpatient follow up [4].

Burns are mostly accidentally occurring painful injury and traumatized patients are also psychologically depressed. Consequently, patients or their care takers urge to go an emergency department instead of primary care, however, most of the burn injuries do not require hospitalization can be managed at the primary care [5]. In our country, there is no regulation or law ruling the transferring chain of the patients and also there is no blockage in no ways at the hospital to send them back to primary care. For this reason, people can freely admit to a tertiary health care facility. While it has no practical handicap for an individual, it increases the workload of the advanced centers and hospitals. This policy also has adverse effects on the patients. Even they may be unaware, they are losing extra time, manpower and economic for the visit to the hospital with accompaniers.

Even it is a well-known fact that patients mostly bypass primary care in our country for some diseases, we would like to analyze the situation for burns in Turkey and find out the reason for bypassing primary care. Besides, to evaluate awareness among family physicians and their baseline knowledge on actual burn management, a questionnaire was carried out. At last, economical outcomes in terms of treatment cost for an individual burn management and visit also studied.

## Material and Method

The burn patients admitted to ambulatory care in our hospital between July 1st and August 31st, 2012, were included to the study. There was a total of 153 admissions. Patients whose management was initiated and terminated at the outpatient clinic were enrolled to the study however one's hospitalized or did not finish the

follow up at our institution were not included. At least, 119 patients fit to the study criterion. All patients were prospectively followed up till to the full healing. All the patients were asked for and to fill out a patient consent.

In our prospective study, demographics of the patients, admission times, burning agent, place of burn, treatment course, treatment modalities applied and parameters affecting the economic costs were recorded. All patients were asked to fill a questionnaire to determine factors affecting their selection of our outpatient clinic instead of primary care, way of coming to hospital, existence of an accompanier. During the treatment course, all interventions and factures of the patients are recorded prospectively.

Randomly sampled twenty-one patients' primary care physicians composed the study group and also randomly sampled twenty-one family physicians, not-related to our study patient population, composed the control group. Randomization made for patients' family physicians via taking every six patients regarding their admissions. Randomization of the control group was carried out via computer selection among family physicians located in Ankara. A questionnaire was applied to all physicians regarding their level of knowledge on the management of burns.

## Results

Of the study group, 55.5% was male and mean age of the group was 29±18.1 (range 1 to 74).

When patients were grouped regarding their ages, patients at the age in between 16-65 years old composed the highest population (Table 1). Evaluation of the educational status of the patients revealed that 43.7% of the patients were well educated. Most of the patients were living in nuclear families (86.6%) (Table 1). Patients' average incomes are shown at Table 1.

When patients were determined regarding their addictions, 37% (44/119) were smokers, 4.2% (5/119) were using both smoke and alcohol, however social consumer. Fifty-nine percent (70/119) had no addiction. In our study group, 14.3% had at least one chronic disease at the background however chronic disease did not lead to burns (Table 2).

**Table 1.** Patient demographics and educational status.

| Parameter | n | % | Parameter | n | % |
|---|---|---|---|---|---|
| ***Gender*** | | | ***Educational status*** | | |
| Male | 66 | 55.5 | Non literate | 4 | 3.4 |
| Female | 53 | 44.5 | Literate | 1 | 0.8 |
| ***Age*** | | | Primary school | 38 | 31.9 |
| 0-6 | 17 | 14.3 | High school | 24 | 20.2 |
| 7-15 | 11 | 9.2 | Senior high school | 34 | 28.6 |
| 16-65 | 88 | 73.9 | University | 18 | 15.1 |
| 65+ | 3 | 2.5 | ***Income*** ($)* | | |
| ***Family population*** | | | 375 ≤ | 20 | 16.8 |
| 1 - 5 | 103 | 86.6 | 376-750 | 73 | 61.3 |
| 5+ | 16 | 13.4 | 750+ | 26 | 21.8 |

*$; United States Dollar (USD).

**Table 2.** Existence of chronic diseases according to the age groups.

| Chronic disease | Age groups (year old) | | | | Total (n:119) | % |
|---|---|---|---|---|---|---|
| | 0-6 | 7-15 | 16-65 | 65+ | | |
| Yes | 0 | 2 | 13 | 2 | 17 | 14.3 |
| No | 17 | 9 | 75 | 1 | 102 | 85.7 |

When patients were grouped regarding the existence of burn injury in the same family previously, 38.7% (46/119) experienced a burn injury either itself or at the family member (Table 3). Most of the patients had scalding (60.5%), however, 35.3% (42/119) of the patients had burns with tea or water boiled with the purpose of preparing tea. When the place of burning is determined, 66.4% of the patients were injured at home (Table 3). Burning agents adjusted to age groups showed scalding as the leading burn cause at all age group (Table 4).

**Table 3.** Existence of previous burn injury in the same family, causing agent and place for burn injury.

| Previous burn | n | % | Burn cause | n | % |
|---|---|---|---|---|---|
| Yes - Relative | 35 | 29.4 | Chemicals | 15 | 12.6 |
| Yes - Patient itself | 11 | 9.2 | Hot liquids | 72 | 60.5 |
| No | 73 | 61.3 | Concentrated liquids | 15 | 12.6 |
| Place of injury | n | % | Steam | 4 | 3.4 |
| Home | 79 | 66.4 | Flame | 5 | 4.2 |
| Work | 19 | 16 | Electric | 1 | 0.8 |
| Open area | 21 | 17.6 | Contact | 7 | 5.9 |

**Table 4.** The burning agents regarding patients' age groups.

| Burning agent -> | Hot liquid | Others | Total |
|---|---|---|---|
| Age | n (%) | n (%) | (n) |
| 0-6 (n=17) | 13 (76.5) | 4 (23.5) | 17 |
| 7-15 (n=11) | 10 (90.9) | 1 (9.1) | 11 |
| 16-65 (n=88) | 65 (73.9) | 23 (26.1) | 88 |
| 65+ (n=3) | 3 (100) | 0 (0) | 3 |
| **Total** | **91 (76.5)*** | **28 (23.5)** | **119** |

*P<0.05

Patients' way of admission to the hospital is and factors affecting patients' not-admitting to the family physician firstly shown at Table 5. When the time span to reach to the hospital was considered, 13.4% of the patients admitted to our hospital the day after the injury.

All the patients at the age below six years old admitted to the hospital with a caretaker, however, three patients at 7-15 years age group admitted solely (Table 6).

Eighty-four patients (70.6%) admitted to hospital at least one accompanier. When the patients reviewed regarding their ways to reach to the hospital, 50.4% of the patients preferred a private vehicle and 5% on foot as they were much closed to the hospital. Three patients (2.5%) reached with public transportation however change the transfer for more than one vehicle (Table 7). Time span for an individual patient to come to the hospital and have the visit and turn back was calculated. Patients completing their outpatient visit and dressing changing in less than one our composed 63.9% (76/119) of the group. It took more than three hours for two patients (Table 7).

Cooling the injured site at the scene was applied in 109 (91.6%) patients. Of these patients, 83.5% (n=91) used tap water, however 11.9% (n=13) did with iced water, 1.9% (n=2) with ice, and 2.8% (n=3) with non-medical and inappropriate ways. Ten (8.4%) patients did not make pre-hospital cooling procedure. Antibiotic regimen was delivered in four (3.4%) of the patients and 96.6% (n=115) of the patients did not have any antibiotics. Sophisticated wound care products used only at 13.4% (n=16) of the patients and conventional dressings was used in the rest (86.6%) of the study population.

**Table 5.** Patients' way of admission to hospital and visit or admitting to the family physician.

| Admission | n | % | Factors affecting patients' not-admitting to the family physician firstly | n | % |
|---|---|---|---|---|---|
| Directly to hospital | 53 | 44.5 | Thought is an emergent situation | 45 | 43.7 |
| Referred | 66 | 55.5 | I am not aware that there is a procedure in this way | 32 | 31.1 |
| *via family physician* | *16* | *13.4* | Family physician is far from the injury scene | 4 | 3.9 |
| *From a hospital* | *50* | *42* | Family physician referred before examination with the suggestion of emergent situation | 2 | 1.9 |
| Any visit ever made to family physician | n | % | I don't know my family physician | 2 | 1.9 |
| Yes | 83 | 69.7 | Other reasons | 18 | 17.5 |
| No | 36 | 30.3 | **Total** | **103** | **100** |

**Table 6.** Relation between the age of the patient and accompanier.

| Age (years old) | Who was the accompanier? | | | | Total |
|---|---|---|---|---|---|
| | Alone | Parents | His/her child | Relatives | n (%) |
| 0-6 | 0 | 17 | 0 | 0 | 17 (14.3) |
| 7-15 | 3 | 10 | 0 | 5 | 18 (15.1) |
| 15+ | 32 | 8 | 9 | 35 | 84 (70.6) |
| **Total (%)** | 35 (29.4) | 35 (29.4) | 10 (8.4) | 39 (32.8) | 119 (100) |

**Table 7.** Time difference spent for coming to the hospital, visiting and dressing changing in between the transportation facility preferred.

| | Transportation with n (%) | | | | Total |
|---|---|---|---|---|---|
| Time period spent for treatment | PT with one vehicle; n (%) | PT with more than one; n (%) | Private vehicle; n (%) | On foot; n (%) | |
| 0-60 mins | 16 (26.2) | 1 (1.6) | 39 (63.9) | 5 (8.2) | 61 |
| 60-120 mins | 28 (58.3) | 0 | 19 (39.6) | 1 (2.1) | 48 |
| 2-3 hours | 6 (75) | 0 | 2 (25) | 0 | 8 |
| 3+ hours | 0 | 2 (100) | 0 | 0 | 2 |
| **Total** | 50 (42) | 3 (2.5) | 60 (50.4) | 6 (5) | 119 |

PT: public transportation.

Of the randomly sampled 21 family physicians, 2 were aware of the burn injury of his/her patient population. To evaluate the base line knowledge of the family physicians on burn treatment, randomly sampled 21 patients' family physician and another group of randomly sampled 21 family physicians not-related to our study group were filled out the questionnaire. All 42 of the family physicians indicated that they will refer the patient to a burns unit or hospital. When they were asked rather had any postgraduate course about the current burn treatment; 15 had in the past one year, 5 in the past two years and 22 (52.4%) had no postgraduate course.

There were 501 visits and dressing changes done for 119 patients as 119 first admission and 382 controls. For the first admission, 22 $ for the visit and 19 $ for the dressing change were charged to the insurance agency. At the controls, 7.52 $ is charged for the visit and 5.93 $ for the dressing change in minimum as is the cost of just dressing changing and for the wounds not requiring further intervention (Table 8).

According to approximate exchange rate (US Dollar - $ / Turkish Lira ₺) at the time of study is the difference in between the managements at hospital and at family physician is in total 5,488.53 $ (Table 9)

**Table 8.** Cost assessment of the study and proposed project for the family physicians being in charge to make burn management of patients fit to outpatient management.

| | Hospital | | Family physician (proposed project) | |
|---|---|---|---|---|
| | Per patient ($) | All group ($) (n:119) | Per patient ($) | All group ($) (n:119) |
| First visit | 22 | 2,618.00 | | |
| Dressing at the first visit | 19 | 2,261.00 | 19 | 2,261.00 |
| Control visit | 7.52 | 2,870.73 | | |
| Control dressing change | 5.93 | 2,265.26 | 5.93 | 2,265.26 |
| Medical consumables | | 2,378.84 | | 2,378.84 |
| Disposable consumables | | 624.15 | | 624.15 |
| **Total** | | 13,017.98 | | 7,529.25 |

*$; United States Dollar (USD).

**Table 9.** The difference in between the managements at hospital and at family physician (if they were done by the family physician.

| | Hospital | Family physician (proposed project) | Saved money for the insurance agency (reduction rate) | |
|---|---|---|---|---|
| Total treatment cost ($) | 109.4 | 63.28 | 46.12 (42.2%) | Total treatment cost |
| Total cost per visit ($) | 26 | 15.03 | 10.96 (42.2%) | Total cost per visit |
| At total ($) | 13017.98 | 7529.25 | 5488.73 | At total |

*$; United States Dollar (USD).

## Discussion

Burn is a frequently encountered trauma worldwide. Even mostly preventable; burn is still an important issue including developed countries [6]. Burns are classified regarding the depth, width and included body site as minor, moderate and major burns [7]. Moderate and major burns are mostly hospitalized and their management undergo at the experienced burn facilities. Minor burns, however, are the group of patients that are not obligatorily sought for experience of established burn facilities. The location of the burn on the body and depth with width do sometimes make the management appropriate for outpatient management [7].

In our country, family medicine is established country wide and people seek medical attention to the nearest physician. However, most of the patients admit to the burn facilities with burns that are not obligatorily requiring sophisticated burn treatment. For the evaluation of aforementioned situation in Turkey, this study was carried out the burns outpatient clinic of a tertiary referral hospital in Ankara.

A total of 119 patients were covered the inclusion criteria. Of the patients, 55.5% were male and the mean age was 29±18.1 (range 1 to 74). Most of patients (73.9%) were at the age of 16 to 65 years old. Our children population is less than the literature reporting the one to third ratio; however, it is acceptable when combined with the fact that there is a pediatric burn care facility in our city. It may affect the preference of the parents of burned children [3].

Studies from our country and foreign countries indicate that low educational status, big family population and low income are effecting the incidence of burns [8,9]. In our study, people were at low income family which is as expected, however, family population was lesser than five (86.6%) and were mostly educated (63.9%; high school or more). Reports done before mostly studied hospitalized patients however our study is an outpatient clinic study. Patients with larger family population and with poor income or not well educated may not be able to reach to our hospital and made their treatment via more traditional methods including rostrum medicine.

Existence of previous burn injury in the same family was 38.7% at our study group. To our opinion, this big percentage is a reflectance of the ignorance and negligence at the population about

burns. It is also the reason for parents not to take preventive measurements to avoid children burns. Hot water was the leading cause of burn among patients and most of the burns occurred at home, parallel to the literature, implying that primary care approaches still have great importance [10]. Educating the parents and/or care takers at home is supposed to diminish the rate of home occurring burns via increasing awareness and identifying what precautions should be undertaken.

Only a small group of patients (13.4%) visited their family physician before coming to the hospital. In our country, there is no transfer algorithm for patients preventing direct admissions to hospital. The rare admittance to the family physician is discussed regarding to questionnaire applied to the patients and family physicians. Even being a minor burn, considering the injury as an emergency situation was the leading reason for the patients/care takers, to admit directly to the hospital, which is reasonable. However, significant number of patients (31.1%) were not aware that there is a procedure that they can ask for medical attention from their family physicians (Table 5). It can be assumed as the public awareness is not satisfactorily evoked in our country as it deserves, even it has been more than three years at the date of study done.

Of the patients (n:83, 69.7%) had visit to their family physician for any reason before, only 19.3% (16/83) admitted to their physician and most of them admitted directly to secondary or tertiary hospital. Patients, referred to hospital after calling their family physician and without examination composed 1.94% (2/103) of our not admitting to family physician group. It may raise a question: can it be the reason for rare admittance to family physician that patients admitted are treated there and we are not aware of that population? To answer this question, family physicians, not related with our patients and selected randomly were asked to answer a questionnaire addressing this issue. Only 35.7% (15/42) of family physicians attended to a post graduate course in the past one year; however, great portion did not follow up the postgraduate educational courses. As family physicians are not updated for the management of a disease which is also a partly emergent situation (for minor burns), it is clear that they are not going to be willingly to manage. Also being un-updated regarding burns may hold them back from taking preventive measurements. Besides, none of them had any poster or sign at their office on burn prevention and first aid precautions.

In the United States and Europe, partial thickness burns are managed by non-specified physicians and the results are acceptable. Vercruysse et al. [5] reported that considerable savings can be achieved with local management of burn patients and referring to burn facilities as indicated. The lack of education of patients, high economic burden and delay in treatment were the reasons of transfer to higher facility in routine. They concluded that video consultation and guiding will help in management of minor burns at the primary care [5]. Parallel to their findings, we also suggest management of minor burns at the primary care however, the lack of education of the family physicians on actual burn management should be resolved.

At least, 86.6% of the minor burns managed by conventional burn dressing changing and it means that this population was appropriate for management at the primary care. Of the study group, 70.6% had at least one accompanier and 95% used some sort of transportation. Besides the work loss of the accompaniers, this transportation is a cause of time loss and also adds to the total cost of burn management detailed later in our manuscript.

In our country, family physicians are not paid for any wound management they made. This procedure is also the same for burn wounds. When the cost of outpatient burn management is calculated, it is approximately 109.4 $ for each treatment course per patient and 26 $ for per visit (*at the time the study was carried out*). If the procedure was carried out at the primary care, then the cost would have been lesser. Apart from the money spent for transportation and the work loss of the accompanier, net gain of the insurance agencies was supposed to be 46.12 $ for each treatment course and 10.96 $ for every visit. The reduction amount for the cost found to be 42.2% for the insurance agencies. While making the assessment, the medical consumables and disposable consumables were taken into account

which should necessarily be consumed and paid back to family physicians. However, work loss for the accompaniers and money spent for transfer to hospital were not taken into consideration. If latter were added to the total amount of hospital costs, then the total cost supposed to be higher. This, consequently, will lead much higher salvaged money and cost reduction percentage. On the other side, management of the minor burns at primary care will be much more convenient for the patients as it is closer to their living places. Burn management at the primary care will also lessen the workload of the secondary and tertiary hospitals and burn facilities.

## Conclusion

Burn injuries are frequently encountered trauma in daily routine however only a small portion of them admit to health facilities. Of the patients admitted to the health facilities, 95% are available for outpatient management. Minor burns, mostly, can be managed at the primary care; however, family physicians are not well updated on the current burn wound care. Patients appropriate for outpatient management are bypassing the primary care and directly admitting to secondary or tertiary health facilities. Bypassing the primary care add to the patients and their care takers/accompaniers extra physical, psychological, social, and economic burden. It also leads extra workload to the related health facilities and leads work loss. Besides, it causes additional cost to health insurance companies. Precautions lowering the cost should be undertaken as is with considerably high cost and required solutions should be brought to increase patients' management, suitable for outpatient treatment, at the primary care facilities.

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