

The suppressive effect on the number of patients with the introduction of off-hours medical expenses in Japan

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ABSTRACT

Aim: In Japan, people can visit all hospitals, including university hospitals, at no cost, and this free access system has several benefits for patients. However, over the last two decades, overcrowding in Emergency Departments (ED) has become a serious problem in Japan, making it difficult to manage severe patients intensively. Some university hospitals have introduced off-hours medical fees. The purpose of this study is to analyze the influence on patient's behavior after the introduction of off-hours medical fees and to examine the proper use of the ED.

Methods: From April 2014, we introduced off-hours medical fees (72 euros: 1 euro = 120 yen). We followed 41,337 patients who came to our ED from April 2013 to March 2015, and we divided them into two groups; Group A (before off-hours medical fees were introduced), which was from April 2013 to March 2014, Group B (after introducing off-hours medical fees), which was from April 2014 to March 2015.

Results: The overall number of walk-in patients significantly decreased, from 42.15 ± 1.64 per day (/day) to 31.09 ± 1.00 /day. The overall number of ambulances accommodated slightly decreased from 20.09 ± 0.50 /day to 19.93 ± 0.54 /day, and the overall number of patients who were hospitalized in our hospital also slightly decreased from 9.08 ± 0.30 /day to 8.39 ± 0.30 /day, but there were no significant differences.

Conclusion: After off-hours medical fees were introduced, the number of non-emergency patients decreased to about 70%, but the rates of hospitalization and ambulance reception hardly changed. The results of our study suggest that introducing off-hours medical fees can reduce the number of non-emergency patients selectively.

Authors' affiliation:

Correspondent author: Toshiya Mitsunaga, MD

Department of Emergency Medicine, Tokyo Jikei University School of Medicine,

3-25-8 Nishishinbashi, Minato-ku, Tokyo 105-8461, Japan

toshi_promise_kt@yahoo.co.jp; toshiya.m@jikei.ac.jp

Mitsunaga T, MD, Ohtaki Y, MD, Kiriya N, MD, Ohtani K, MD, Yajima W, MD, Hibi T, MD, Takeda S, MD

Department of Emergency Medicine, Tokyo Jikei University School of Medicine, Tokyo, Japan

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INTRODUCTION

In Japan, people can visit all hospitals, including university hospitals, and this free access system has benefitted patients for a long time. However, over the last two decades, overcrowding in the emergency department (ED) has become a serious problem in Japan. The number of non-emergency patients who visit the ED in off-hours (overnight of weekdays, and all day of weekends and public holidays) is increasing annually, and because of this, it has become more difficult to see severe patients smoothly, and emergency staff is overburdened [1-3]. The number of patients transported by emergency services was about 2.7 million in 1990, 4 million in 2000, and about 5.2 million in 2012, which shows that ambulances transported one in every 24 people. Notably, the number of non-emergency patients transported by ambulance increased dramatically [1-2]. The average time from emergency call to hospital arrival is 38.7 minutes in Japan and 54.9 minutes in Tokyo. This time becomes longer annually, and it is certainly important to accept ambulances as soon as possible.

Off-hours medical fees:

Normally, all Japanese people have to pay medical fee which is 30% of the costs, including examination by doctors, all kind of tests and prescription. The number of medical institutions introducing off-hours medical fees is increasing as a countermeasure against the rising number of patients who come to the ED [3-12]. According to a report by Ehara [3], in October 2008, 142 hospitals had introduced this special fee, and more than 200 hospitals were proceeding to introduce it in summer 2011. The reasons for introducing a special charge are:

- suppressing the number of non-emergency patients,
- putting effort into the treatment for seriously ill patients,
- providing advanced emergency medical care,
- preventing deterioration of medical treatment quality,
- starting immediate medical examination for emergency patients,
- maintaining a safe medical care system,
- and preventing overwork and exhaustion of medical staffs [7-9].

There are several reports of introducing off-hours medical fees, and all of them showed a suppressing effect on the number of patients who visit the ED [3-12].

Overview of our emergency department:

Our hospital is located in the center of Tokyo. It is an emergency medical institution affiliated with JIKEI university and has 1,075 beds. Our ED consists of seven initial treatment beds, and six fast tracks for holidays and evenings. All patients visiting our ED are accepted 24 hours a day. We have a North American ER-type practice, that is, emergency physicians and residents make an initial diagnosis, and if necessary, we

consult with other departments. Since our department was established in 2006, the number of patients visiting our ED has increased (25,799 patients in 2012). In particular, the number of ambulances we accept increased dramatically, from 4,475 in 2006 to 8,935 in 2012. For this reason, chronic overcrowding has made it difficult to properly manage our ED. Under such circumstances, our hospital introduced off-hours medical charges in April 2014 with the aim of concentrating on treatment of seriously ill patients. We collected 72 euros (0.2% of average annual income in Japan) in addition to the medical fee from patients who visited our ED on Sundays, public holidays, our university anniversary days (May 1st, October 15th), New Year's holiday period (December 30th to January 4th), and overnight (from 17 o'clock to 8 o'clock) on weekdays. All the information regarding the special fee is explained to patients before their examination by automatic voice guidance, in-hospital bulletin boards, and at accounting reception. Excluded criteria included patients who:

- a) arrive by ambulance,
- b) visited the hospital that day and return due to exacerbation of symptoms,
- c) have an introduction letter for our ED from other hospitals,
- d) have reservations from staff doctors to come to our ED for injections or treatments, or
- e) are deemed urgent after being seen by our doctors.

The purpose of this study is to investigate several indicators and analyze patient's behavior after the introduction of off-hours medical charges for considering proper use of the ED.

METHODS

1. Data collection:

We followed all patients (41,337) who visited our ED from April 2013 to March 2015. The patients were divided into two groups; Group A consisted of patients who visited our ED from April 2013 to March 2014, before we introduced off-hours medical fees (22,716 patients). Group B consisted of patients who visited our ED between April 2014 and March 2015, after we introduced off-hours medical charges (18,621 patients).

2. Statistical analysis:

For the above patient groups, we examined the following:

- 1-The number of walk-in patients,
- 2-The number of ambulances accommodated,
- 3-The number of ambulances refused,
- 4-The time not available for emergency care,
- 5-The number of hospitalized patients, and
- 6-The reasons for refusing ambulances.

Data are presented as mean \pm 2SE. To compare variables for (1), (2), (3), (4), and (5), Student's t-test was used. The χ^2 test was used to compare variables for (6). A *p*-value less than 0.05 was considered statistically significant.

3. Definition of the number of ambulances not accepted:

The number of unaccepted requests for a patient from EMS under the jurisdiction of the Tokyo Fire Department or other prefectures for various causes (e.g., treating seriously ill patients, other departments cannot accept patients, initial treatment beds are full, patient's request, or the patients are in remote places).

4. Definition of time not available for emergency care.

Time during which no emergency patients were accepted due to various causes (e.g., treating seriously ill patients, other departments cannot accept patients, initial treatment beds are full, hospital beds are full).

Notification that the hospital has discontinued accepting emergency patients is posted on the emergency information terminal set up in all emergency institutions in Tokyo, and EMS staff can always see it.

RESULTS

1. Comparison before and after the introduction of off-hours medical charges: (Figures 1 to 5)

The number of walk-in patients decreased significantly, from 42.15 ± 1.64 per day (/day) (Group A) to 31.09 ± 1.00 /day (Group B). The number of ambulances accommodated slightly decreased from 20.09 ± 0.50 /day (Group A) to 19.93 ± 0.54 /day (Group B), but there was no significant difference. Although the number of unaccepted ambulances slightly decreased, from 4.91 ± 0.27 /day (Group A) to 4.54 ± 0.27 /day (Group B), there was no significant difference. The time not available for emergency care decreased significantly from four hours, 53 minutes \pm 21 minutes/day (Group A) to two hours, 26 minutes \pm 16 minutes/day (Group B). The number of hospitalized patients decreased slightly, from 9.08 ± 0.30 /day (Group A) to 8.39 ± 0.30 /day (Group B), but there was no significant difference.

2. Reasons for not accepting ambulances:(Figure 6)

We found the reasons for not accepting ambulances to be:

- Full initial treatment beds,
- Many staff seeing seriously ill patients,
- Full hospital beds,
- Instructions to transfer to other hospitals (Primary care institutions or the nearest medical institutions),
- Other departments doctors cannot respond,
- Patient's request, and
- Other.

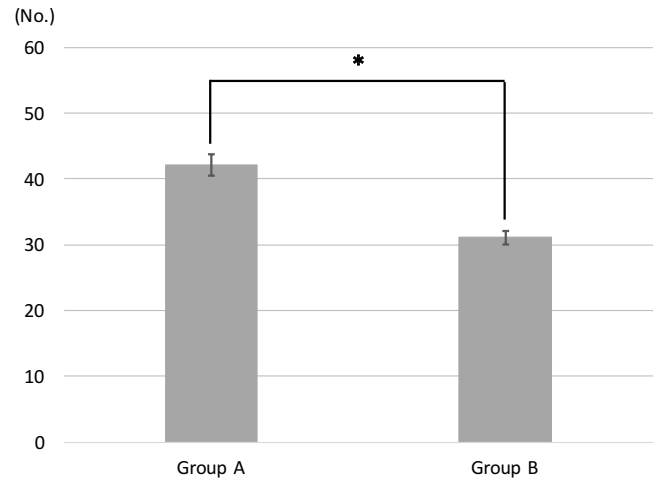


Figure 1: The transition of the number of walk-in patients per day. Data shown are the mean \pm 2SE. (*: *p* < 0.05, Student's t-test.)

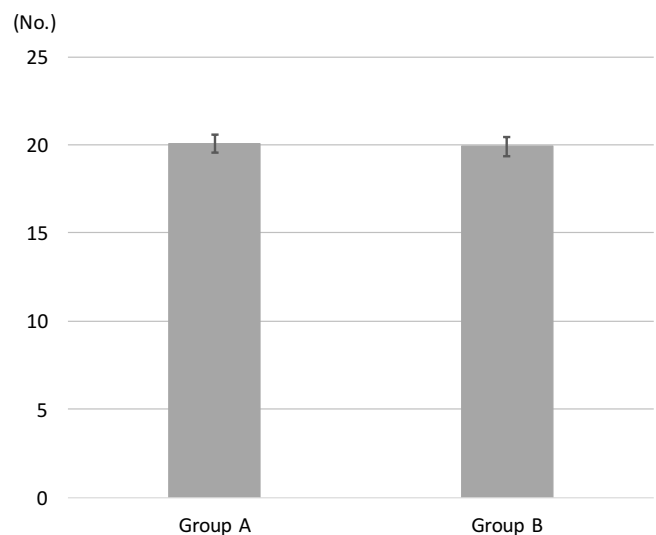


Figure 2: The transition of the number of ambulances accommodated per day. No significant differences were found between the study groups. Data shown are the mean \pm 2SE.

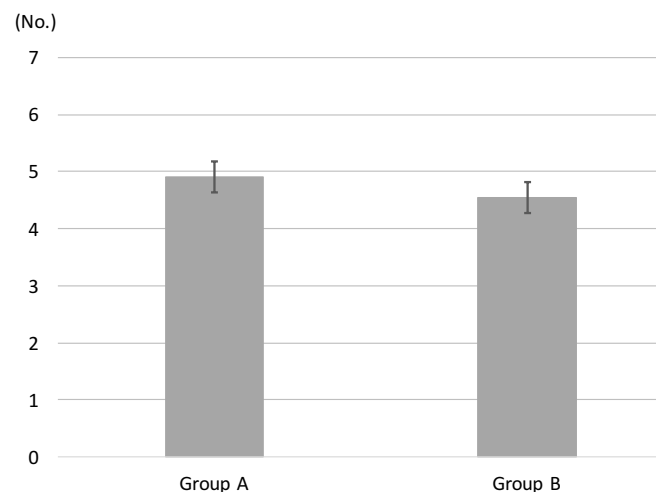


Figure 3: The transition of the number of unacceptance ambulances per day. No significant differences were found between the study groups. Data shown are the mean \pm 2SE.

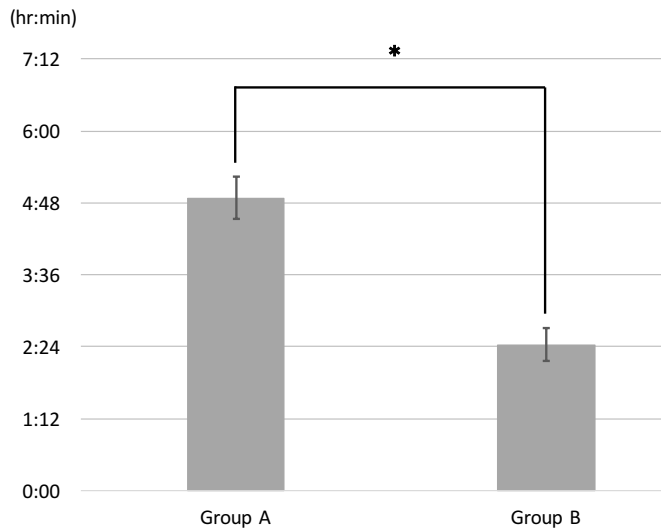


Figure 4: The transition of unavailable time for emergency care per day. Data shown are the mean ± 2SE. (*: $p < 0.05$, Student's t-test.)

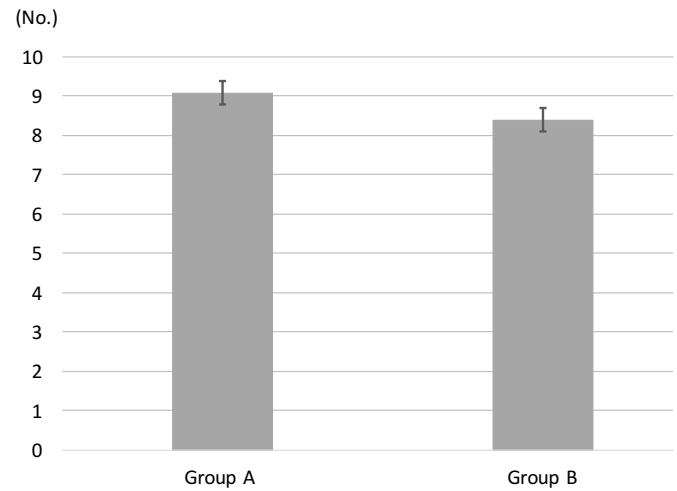


Figure 5: The transition of the number of hospitalized patients per day. No significant differences were found between the study groups. Data shown are the mean ± 2SE.

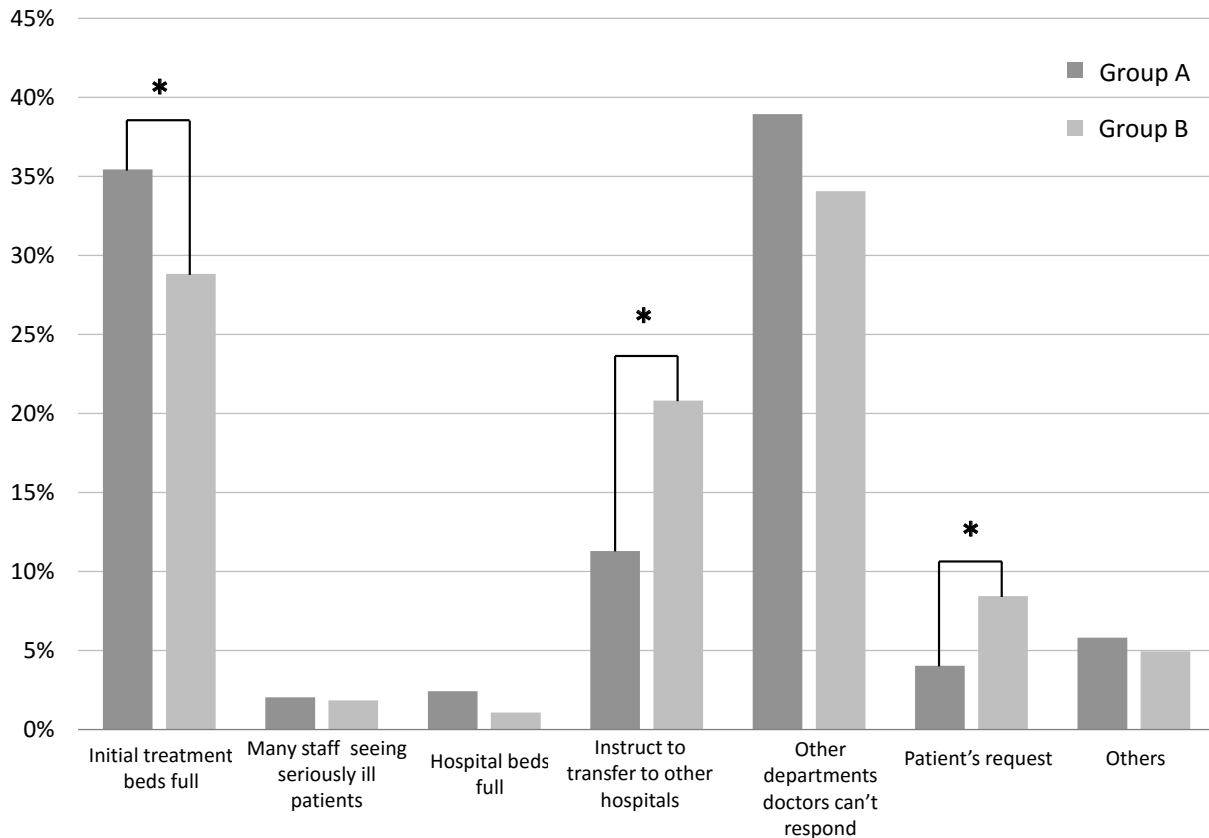


Figure 6: The detail of reasons for unacceptance ambulances. Data were analyzed by Chi-square test. (*: $p < 0.05$).

The percent of “Full initial treatment beds” decreased significantly from 35.45% (Group A) to 28.83% (Group B). The percent of “Many staff seeing seriously ill patients,” “Full hospital beds,” “Other departments doctors cannot respond,” and “Other” slightly decreased from 2.04% (Group A) to 1.84% (Group B), from 2.42% (Group A) to 1.07% (Group B), from 38.95% (Group A) to 34.07% (Group B), and from 5.81% (Group A) to 4.94% (Group B), respectively, but there

were no significant differences. The percent of “Instructions to transfer to other hospitals” significantly increased from 11.30% (Group A) to 20.81% (Group B). Notably, the percent of “Instruct to transfer to nearest medical institutions” increased dramatically from 6.02% (Group A) to 13.37% (Group B). The percent of “Patient’s request” significantly increased from 4.03% (Group A) to 8.44% (Group B).

DISCUSSION

Introduction of off-hours medical charges was effective in securing the right to receive appropriate medical treatment for severely ill patients, reducing the work of emergency medical staffs, improving labor motivation, and enlightening residents about the plight of emergency medical care. However, there were several problems, such as a decrease in visits by severely ill patients, ED visit opportunity lost, and inequity for economically weak people [10].

Indicators for judging the appropriateness of ED visits differ in previous studies. Selby [14] and Wharam [16] classified severity of diagnosis name into four categories and investigated the rate of visiting the ED and being hospitalized. Hsu [15] investigated not only the hospitalization rate and mortality rate but also the ICU hospitalization rate as a rate which was confined to critically ill patients. Ehara [4] used information on whether patients were hospitalized after visiting the ED as an indicator, and Yoshida [12] used information on whether patients used an ambulance when they come to ED as an indicator.

In our study, we got the diagnosis name, but we suspect that it is impossible to distinguish suspicious disease names and insurance disease names, so we decided that it is inappropriate to use the diagnosis name for classification of severity. Therefore, we used information regarding whether patients were hospitalized after visiting ED and whether patients used an ambulance when they came to the ED (the number of ambulances accommodated) as an indicator, as did as Yoshida et al. [12]. Also, a number of reports about being unavailable for emergency care related to overcrowded EDs have been published [17-19], and we used the number of unaccepted ambulances and time not available for emergency care as indicators of optimized ED management.

A number of empirical studies have been carried out, mainly in the United States, on the influence of differences and changes in the patient's financial burden on patients' ED visits behavior or health. The RAND Health Insurance Experiment [13] compared various patients' health care cost burdens and showed that ED visit rates decreased to 67% of the original value in the group with financial burdens. Furthermore, in the group with the burden, the rate of ED visits due to diseases with higher urgency decreased to 77% and visits due to diseases with less urgency decreased to 53% of the original value. It was obvious that the decrease in ED visits for low-urgency diseases was significantly large.

In Japan, two papers are representative for dealing with the impact of the special fee on the number of ED visits. Ehara [4] investigated the number of ED visits in off-hours at eight medical facilities that introduced the special fee. As a result, although the number of ED visits significantly decreased to 78% of the original value, the number of hospitalizations slightly decreased to 98% of the original value after the introduction of the special fee. Yoshida [12] also reported that the number of children visiting the ED decreased to 45% of the previous year, but the number of hospitalizations and ambulances accepted

slightly increased to 104%, with no change respectively after the introduction of the special fee. In our study, although the number of walk-in patients significantly decreased to 73.8% of original value, the number of ambulances accepted slightly decreased to 99.2%, and the number of hospitalizations also slightly decreased to 92.5% of the original value, and this is the same result as the previous study. This result suggests that the introduction of off-hours medical charges has a suppressing effect of visiting ED, especially for non-emergency patients.

In our study, we analyzed for the first time the time unavailable for emergency care. Hirota [20] reported that patients frequently stay in the ED for a long time because of "waiting for examinations" and "waiting for hospitalization" when the ED is crowded. We can expect that as the number of walk-in patients was reduced, ED congestion was alleviated, and the average time per stay for ED patients became shorter. Thereby, the time unavailable for emergency care could be significantly shortened. From that point, it can be suggested that efficiency of the ED management has been improved.

In past reports [17-19], the top three reasons for not being able to accept ambulances were "No medical specialists can respond", "During surgery and treatment", and "Initial treatment beds are full." In our data, "Other departments cannot respond" and "Initial treatment beds are full" occupied about one-third each, and "Instruct to transfer to other hospitals" was about 20%. "Full initial treatment beds" significantly decreased, suggesting that efficiency of the ED management has been improved.

On the other hand, the fact that the number of ambulances not accepted did not decrease significantly is thought to be affected by the increase in "Instruct to transfer to other hospitals" and "Patient's request." "Instruct to transfer to other hospitals" increased about twice, but the majority was "Instruct to transfer to the nearest medical institutions." We can expect that most of the emergency requests were from a distance. Although the number of "Other department doctors cannot respond" has decreased, it still accounts for 30% or more of the reasons for not accepting ambulances. Therefore, it is suggested that countermeasures throughout the hospital are necessary to increase hospitalizations and the number of ambulances accepted.

The limitation of this study is that the study design is retrospective study and we gathered the data from only medical record. We do not consider biases other than special fee, for example, there are no clear criteria for emergency stop initiation by emergency managers and our hospital has its own unique anniversary day. Moreover, we did not collect the data of the number of patients who intentionally use ambulances to avoid paying special fee, and the effect of the special fee on the economically weak people, so further investigation is necessary.

CONCLUSION

We examined 24 months before and after the introduction of off-hours medical charges. With the introduction of off-hours medical fees, the rate ED visits for non-emergency patients represented by walk-ins decreased to about 70%, but the rates of hospitalization and ambulance reception have hardly

changed. In addition, time unavailable for emergency care also decreased with a significant difference. It is suggested that by introducing off-hours medical fees, it is possible to selectively reduce the number of non-emergency patients visiting the ED and to optimize the ED management.

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