Original Article

Unique characteristics of frequent presenters to the emergency department in a Japanese population: a retrospective analysis

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Aim: Little evidence on Japanese frequent presenters (FPs) is available. Therefore, this retrospective cohort study compared characteristics between FPs and non-frequent presenters (NFPs) in emergency departments (EDs) in Japan.

Methods: Frequent presenters included those who presented to an ED ≥4 times during the study period from August 1, 2012 to July 21, 2013. The primary outcomes were triage level and disposition. Secondary outcomes were ED length of stay, method of arrival, and discharge diagnosis.

Results: During the study period, 195 FPs had 1,154 visits to the ED, compared to 15,953 visits by 13,838 NFPs. The sex distribution between FPs and NFPs was comparable (107 men [54.9%] versus 7,070 men [51.1%], respectively; $P = 0.29$), but the mean age was significantly higher in the FP group (57.3 versus 46.5 years, respectively; $P < 0.0001$). Among the FPs, the rate of free governmental health insurance was higher than that of those who pay 30% of health costs (35 patients paid 0% [79.5%] versus 109 patients paid 30% [42.6%], respectively). Condition severity (FP, 84 severe cases [7.28%]; NFP, 1,320 severe cases [8.27%], respectively) and rate of admission (FP, 207 admissions [17.9%]; NFP, 2,987 admissions [18.7%], respectively) were comparable between the groups, although the rate of ambulance use was lower for the FP group. The most frequent diagnostic codes (International Classification of Diseases, 10th Revision) in the FP group were "symptoms and signs".

Conclusion: Triage levels and hospital admission rates were not significantly different between FPs and NFPs in this single-center study in Japan.

Key words: Emergency department, frequent presenter, Japan

BACKGROUND

FREQUENT PRESENTERS (FPS) to the emergency department (ED) account for 1.4–28% of all ED visits.[1–4] In Australia, FPs were more frequently hospitalized, more frequently transported by ambulance, and more likely to have an ED discharge diagnosis of a psychiatric problem than were non-frequent presenters (NFPs).[2]

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As a patient's health behaviors and, ultimately, diagnosis are affected by their beliefs and psychiatric needs, the diagnoses of FPs cannot always be explained by simple linear disease models, which determine that the disease was caused from only one factor.[5] Therefore, understanding the characteristics of FPs is important from a health management perspective.

Studies have reported that FPs to EDs increase overall wait times and medical costs associated with health services.[4,6,7] Thus, clinicians and policy-makers face the challenging and contentious issue of frequent visits to the ED by a specific group of patients.[1,7,8] Because Japan differs culturally and epidemiologically from other countries that have reported the characteristics of FPs, these unique characteristics might be different in Japan. Population-specific differences and medical insurance systems vary among countries.

In Japan, patients ≥75 years of age pay 10% of their medical bills, while those aged 18–64 years pay 30%. Moreover, patients who meet the requirements for social welfare, namely, those with no financial assets and difficulty maintaining employment, do not pay for their medical services.

Chishiro *et al.*[9] evaluated the ED visit habits of 28 FPs at a Japanese institution over a 1-year period. Over the study period, the 28 FPs accounted for 825 (5.4%) of the total 15,343 ED visits, with "psychiatric disorder" being the most frequent diagnosis. Of these 825 visits, 96% of cases were discharged. However, due to the small sample size, the results of Takao's study might not be generalizable. To the best of our knowledge, no other study has evaluated the characteristics of FPs to the ED in a Japanese population. Therefore, our aim was to describe the characteristics of FPs and NFPs to the ED in a Japanese population.

METHODS

Study design

THIS RETROSPECTIVE COHORT study was undertaken using data from the ED of Tokyo Bay Urayasu–Ichikawa Medical Center in eastern Tokyo, Japan, a 344-bed urban acute care community hospital with an annual ED census of 31,793. It is a regional emergency center with closed intensive care unit style and designated stroke/cardiovascular center with the ability to perform percutaneous coronary artery intervention and infusion of tissue plasminogen activator 24 h/day. The study period was from August 1, 2012 to July 31, 2013. The study was approved by the hospital's ethics committee.

Based on a previous study, FPs were defined as those presenting to the ED ≥4 times over the study period, corresponding to the 99th percentile of the number of visits by all patients over the previous year.[10,11] Non-FPs were defined as those presenting to the ED 1–3 times over the study period. We included patients and visits that presented to the ED of Tokyo Bay Urayasu-Ichikawa Medical Center. The visits of those who were transferred to another department, were <18 years old, or had missing data in their medical record were excluded. Electronic medical records were reviewed and the following information extracted for analysis: age, sex, insurance status, method of arrival, triage level, discharge diagnosis, length of ED stay, and disposition. At the study site, a board-certified emergency physician ensured that this information is recorded in the electronic medical record of all patients admitted to the ED after every clinical shift. All data were extracted by a database specialist who was not associated with the study.

Data collection and measurements

The primary outcomes were triage level and disposition. Triage levels were based on the Japan Triage and Acuity Scale and classified as either severe, including resuscitation or emergent need for resuscitation, or non-severe, including urgent, less urgent, and non-urgent. This triage system has proven validity.[12] The secondary outcomes were length of stay, method of arrival to the hospital, and discharge diagnosis. The length of stay was defined as minutes between reception and leaving ED. Arrival method was divided into two groups: transport by ambulance or not. Disposition was grouped into discharge and admission, including death in ED. To analyze insurance, participants were divided into three groups based on the patient's normal out-of-pocket expenses, as registered in the medical billing system: 0% group, 10% group, and 30% group. Discharge diagnoses were classified using the International Classification of Diseases, 10th Revision (ICD-10) codes, in which the chapter of R00–R99 is classified as "Symptoms and signs". The chapter also includes abnormal clinical and laboratory findings and conditions that are not classifiable elsewhere. As the data for discharge diagnosis and insurance status were in text format, we were unable to code all data. Thus, to analyze discharge diagnosis and insurance status between the FP and NFP groups, we randomly extracted the same number of cases from the NFP group as there were in the FP group. In the comparison of insurance, patients who paid 100% for their medical bill were excluded.

Data analysis

The mean and standard deviation were calculated for continuous variables; the number of cases and percentages were calculated for nominal variables. Between-group differences in the distribution of sex, arrival method, and disposition were evaluated using χ^2-tests. As the data were non-normally distributed, Mann–Whitney *U*-tests were used to compare age and length of stay in the ED. We compared group differences in insurance status using χ^2-tests, and correction for multiple testing was carried out by Bonferroni adjustments. To assess the influence of FPs on primary outcome, a multivariable binary logistic regression analysis was undertaken to determine odds ratios, 95% confidence intervals, and *P*-values. This analysis was for disposition and severe condition (higher triage level) with adjustment for patient background (age and sex), while also adjusting for within-patient clustering using a generalized estimating equation. The unit of analysis was "visits" and the dependent variable for the regression analysis was primary outcome, including disposition and triage level. The independent variable was

age, sex, and FPs. Independent variables were selected based on a priori hypotheses. Discharge diagnoses were identified by their ICD-10 codes, and the proportional difference in codes between the FP and NFP groups was evaluated.

As we undertook a retrospective analysis of data available in electronic medical records, and the NFP group with respect to disposition was randomly assigned, the post-hoc power calculation for primary outcomes was planned and the desired effect size determined from previous studies.[10,11] For analysis, relevant variables were extracted to a Microsoft Excel spreadsheet (Microsoft Corporation, Seattle, WA, USA) and between-group differences evaluated using Stata 12 (StataCorp, College Station, TX, USA), with statistical significance defined by a P-value <0.05.

RESULTS

DURING THE 12 -month study period, 30,328 ED visits by 23,529 patients were recorded. Of these visits, 17,107 were contributed by 14,033 patients ≥18 years, and their data were extracted for analysis (Fig. 1). The number of visits to the ED ranged from 1 to 79, with a median of 1 visit and a 99th percentile of 4 visits. From all patients, we identified 195 FPs (1.39%) who contributed 1,154 (6.75%) visits, compared to the 15,953 visits contributed by 13,838 NFPs (Table 1A). The FP group was significantly older than the NFP group (57.3 versus 46.5 years, respectively; $P < 0.0001$). In the FP group, the rate of patients who had free governmental health insurance was significantly higher than that in the NFP group (17.2% versus 3.3%, respectively; $P = 0.0002$) (Table 1B). Patients who had free governmental health insurance were at a greater risk of being FPs than were patients who had 30% insurance coverage (79.5% versus 42.6%, respectively; $P < 0.0001$) (Table 2). The severity of condition and rate of admission were not significantly different between the FP and NFP groups. However, from the multivariable analysis, FPs were at a lower risk of being admitted to hospital or having a severe condition (Table 3).

The proportion of patients transported to the ED by ambulance was significantly smaller for the FP group than for the NFP group (34.5% versus 39.7%; $P < 0.0001$).

The proportion of patients with a "severe" status at triage was comparable between the groups (FP, 7.28%; NFP, 8.27%; $P = 0.25$). The distribution of ICD-10 diagnostic codes for the FP and NFP groups, respectively, was as follows (Fig. 2): symptoms and signs (19.5% versus 11.3%), digestive (10.4% versus 7.54%), musculoskeletal (7.45% versus 4.07%), endocrine (3.38% versus 1.65%), neoplasm (3.21% versus 0.61%), and, less frequently, respiratory (12.3% versus 14.1%), infectious (7.45% versus 12.9%), injury and poisoning (13.9% versus 25.4%), genitourinary (2.77% versus 3.99%), and ear (1.12% versus 2.34%).

A post-hoc power calculation confirmed sufficient power (>0.90) for all primary outcomes and insurance.

DISCUSSION

OUR RETROSPECTIVE STUDY evaluated the characteristics of Japanese individuals classified as FPs to the ED, with our analysis based on 17,107 ED visits contributed by 14,033 patients. The mean age was significantly higher in the FP group. We did not identify differences in triage levels or admission rates between the FP and NFP groups, although the rate of ambulance use was lower for the FP group. From the multivariable analysis, FPs were at a lower risk of being admitted to hospital or having a severe condition. The most frequent ICD-10 diagnostic codes in the FP group were symptoms and signs, digestive, musculoskeletal, endocrine, and neoplasm, with respiratory, infectious, injury and poisoning, genitourinary, and ear being the least frequent diagnostic codes.

No differences in triage levels or admission rates were identified between the FP and NFP groups. Furthermore,

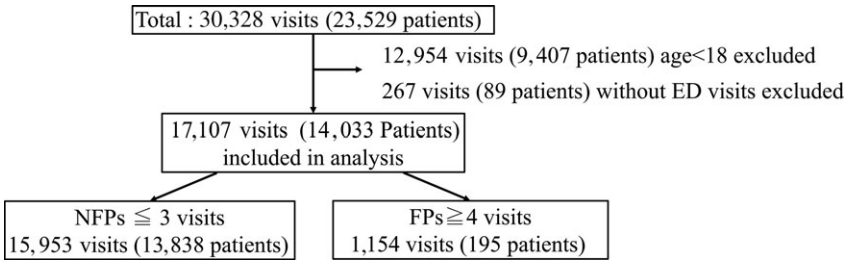

Fig. 1. Inclusion of patients visiting the emergency department (ED) of an urban acute care community hospital in Tokyo, Japan, between August 1, 2012 and July 31, 2013. FP, frequent presenter; NFP, non-frequent presenter.

Table 1. Baseline characteristics of patients (A) who presented to a Japanese emergency department, (B) grouped according to insurance status

(A)	FPs	NFPs	*P*-value
n (patients)	195	13,838	
Men	107 (54.9)	7,070 (51.1)	0.2900
Age, years	57.3 ± 20.4	46.5 ± 20.2	<0.0001
n (visits)	1,154	15,953	
Transport by ambulance	398 (34.5)	6,331 (39.7)	<0.0001
Time, min	165 ± 149	157 ± 140	0.0900
Admitted	207 (17.9)	2,987 (18.7)	0.5300
Triage (severe)	84 (7.28)	1,320 (8.27)	0.2500
Resuscitation	23 (1.99)	410 (2.57)	
Emergent	61 (5.29)	910 (5.70)	
Urgent	408 (35.4)	5,884 (36.9)	
Less urgent	614 (53.2)	8,618 (54.0)	
Non-urgent	48 (4.16)	131 (0.82)	
(B)	**FPs**	**NFPs†**	***P*-value**
n (patients)	195 (2 excluded: paid 100%)	178 (17 excluded: paid 100%)	
Men	105 (53.8)	94 (52.8)	0.2900
Age, years	57.4 ± 20.5	46.5 ± 19.2	<0.0001
Amount paid by patient, after insurance			
0%	35 (17.2)	9 (3.3)	0.0002
10%	49 (22.7)	22 (12.7)	0.0023
30%	109 (57.0)	147 (74.4)	<0.0001

Values are reported as the mean ± standard deviation or *n* (%).
†The same number of cases was randomly extracted from the non-frequent presenters (NFP) group as there were in the frequent presenters (FP) group.

Table 2. Comparison between frequent presenters (FPs) and non-frequent presenters (NFPs) to a Japanese emergency department, grouped by insurance coverage

Amount paid by patient, after insurance	FPs (*n* = 193)	NFPs (*n* = 178)	*P*-value†	
0%	35 (79.5)	9 (20.5)	0.9220	<0.0001
10%	49 (69.0)	22 (31.0)		
30%	109 (42.6)	147 (57.4)	<0.0004	

Values are reported as *n* (%).
†Bonferroni adjustments applied.

FPs had a lower risk of being admitted to hospital or having a severe condition. In contrast, a study in Australia reported that FPs were more likely to be admitted to hospital.[2] In our study, fewer FPs were transported by ambulance, a finding that is also in contrast to previous reports in other countries, which indicated higher rates of ambulance use by FPs than by NFPs.[2,10,13] Therefore, previous research undertaken in other countries cannot be reliably applied in Japan. Moreover, the median number of visits in our study was 1, and the 99th percentile was 4; these rates are lower compared with those in other countries. The health-care system in Japan is structured such that patients can consult specialists directly, without referral from a family practitioner; it is easy to access specialists and general/primary care doctors. In part, that could explain the lower frequency of ED visits by FPs than that reported by previous studies. Our study also differed from a previously published study on ED visits

Table 3. Logistic regression analysis using a generalized estimating equation (A) for triage level of frequent presenters (FPs) to a Japanese emergency department and (B) for disposition of FPs

(A)	Triage (severe)	Triage (not severe)	Odds ratio (95% CI)	*P*-value
Age	63.8 (20.5)	48.2 (20.5)	1.04 (1.04–1.04)	<0.0001
Men	807 (57.5)	8,070 (51.4)	1.55 (1.38–1.74)	<0.0001
FPs	84 (5.98)	1,070 (6.81)	0.68 (0.51–0.91)	0.0080
(B)	**Admitted**	**Not admitted**	**Odds ratio (95% CI)**	***P*-value**
Age	64.7 (20.5)	46.0 (20.5)	1.05 (1.05–1.05)	<0.0001
Men	1,758 (55.0)	7,129 (51.2)	1.47 (1.34–1.60)	<0.0001
FPs	207 (6.48)	947 (6.81)	0.67 (0.52–0.86)	0.0020

Values are reported as *n* (%).
CI, confidence interval.

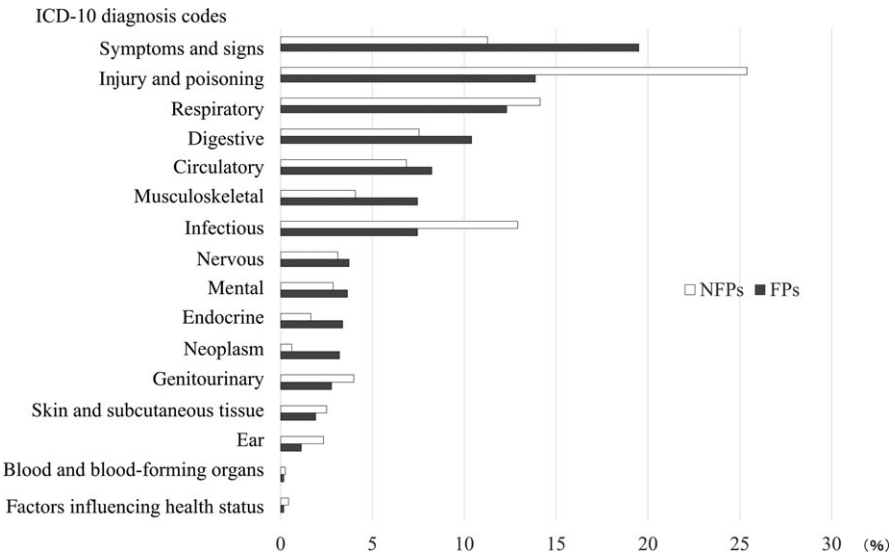

Fig. 2. Percentage differences in International Classification of Diseases, 10th Revision (ICD-10) diagnostic codes between frequent presenter (FP) and non-frequent presenter (NFP) groups of patients at the emergency department of an urban acute care community hospital in Tokyo, Japan.

in a rural area of Japan, where few hospitals were available and the study sample size was only 28 patients.[9]

As almost all patients in Japan enroll in medical insurance, all the individuals in the present study were insured. In a study in the USA, more FPs had Medicaid than private health insurance (odds ratio, 1.57; 95% confidence interval, 1.34–1.85).[6,14] Comparatively, in our study, a significantly greater proportion of FPs had free governmental health insurance than did NFPs. A qualitative study in the USA described three reasons why FPs with Medicaid coverage visit the ED: negative personal experiences with the health-care system, challenges associated with low socioeconomic status, and a significant chronic mental and physical disease burden.[14] Therefore, adopting preventative social and health-care measures to mitigate these factors would be important to reduce the number of FPs. In Japan, we identified FPs as being older, a finding similar to that in a previous report in Australia.[2] Therefore, undertaking measures to better support an aging population within the community might also be effective for decreasing the number of FPs.

Regarding discharge diagnoses, chronic diseases including coronary artery disease, stroke, and asthma were more frequently reported in FPs in other countries.[6] In our study, ICD-10 discharge diagnoses in the FP group more

frequently included symptoms and signs, digestive, musculoskeletal, endocrine, or neoplasm disease. Patients with chronic diseases, who often have unstable symptoms, could require more frequent ED visits. Similar to the findings from other countries, it is difficult to fit simple linear disease models to explain the frequency of "symptoms and signs" in FPs.[5] Patients in the NFP group tended to visit the ED for acute conditions, including infectious diseases, injury and poisoning, or ear problems. Acute diseases typically require only one visit, without follow-up, resulting in a reduced likelihood of frequent visits. A previous study reported a high prevalence of mental health-related diagnoses in FPs.[9,15] The absence of between-group differences in psychiatric diagnoses might have been influenced by the absence of full-time doctors in the psychiatry department of our hospital. However, almost all of the general community hospitals in Japan have a similar situation; therefore, this did not likely have an influence on results. By comparison, mental disorders diagnoses were comparable for the FP and NFP groups in our study, further confirming the difficulty of applying findings from other studies to Japan.

This study has some limitations. First, a consistent definition of FP is lacking; each study has used its own definition, which varies in published reports from 2 to 20 visits within a 1-year period.[1,2,7,16] A systematic review reported that ≥4 visits within 1 year was the most commonly used definition of FPs to the ED.[10] Therefore, our definition of FP was consistent with the definition used in the majority of other studies. The lack of a standardized definition creates challenges in broadly comparing the number of emergency transports or admission rates between studies. For international comparisons, a consensus definition is necessary, using a cut-off number of visits that increase medical expenses and burden on ED resources. Second, we only considered the discharge diagnoses from the ED, without follow-up by telephone or review of post-hospitalization for confirmation. Third, the social context of Japan might have confounded the results. Specifically, the number of elderly people living alone is increasing.[17] These individuals might not have sufficient family support and might not use nursing care services, which would influence the number of ED visits. Moreover, for patients with restrictions in activities of daily living or impairments in communication, family and caretakers might not be able to assess the patient's condition, which would also result in more frequent visits. Therefore, the inability to evaluate social backgrounds owing to the retrospective nature of the study design is another limitation. Fourth, because the excluded cases were by visit rather than by patient, this could have led to selection bias. We were unable to code all data about discharge diagnosis and insurance status, which also leads to selection bias. Finally, the present study was undertaken at the ED of a single community hospital in Japan. Although the population pyramid of the Urayasu–Ichikawa area is quite similar to the national population pyramid, the localized nature of the study could limit the generalizability of the results.[12] A larger multicenter study is necessary to confirm the present findings.

CONCLUSION

OVERALL, WE IDENTI fied unique characteristics of FPs in Japan compared to FPs in other countries; namely, FPs were older and accessed the ED by means other than ambulance transport. However, the severity of condition and rate of admission were not significantly different between the FP and NFP groups. Further research needs to be undertaken at other facilities to provide data that could prompt initiatives to reduce the burden on physicians or reduce medical costs.

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WE EXTEND OUR gratitude to our ED members for their dedication and professionalism.

DISCLOSURE

Approval of the research protocol: The protocol for this research project was approved by a suitably constituted Ethics Committee of the institution (the ethics committee of Tokyo Bay-Urayasu-Ichikawa Medical Center) and it conforms to the provisions of the Declaration of Helsinki.
Informed consent: N/A
Registry and registration number of the study/trial: N/A
Animal studies: N/A
Conflict of interest: None.

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