

Demographic and geographical characteristics of pediatric patients presenting to a convenient clinic at a large railway station in a metropolitan area of Tokyo

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Abstract

There is an increasing demand for medical provision systems that are friendly for working mothers with sick children in Japan. The aim of this cross-sectional, observational study was to analyze the demographic characteristics of pediatric patients presenting to a convenient care clinic, which was located in a large railway station and offered primary care with after-hours accessibility in a metropolitan area of Tokyo.

We analyzed anonymous data for patients who had visited the pediatric department at a clinic between August 2013 and June 2016. Data regarding patients' sex, age, time of visit, waiting time, presence or absence of an appointment, diagnosis, and addresses were collected from electronic health and billing records.

Overall, 8091 patients visited the department 45,388 times. The numbers of visits by patients who resided within 2, 5, and 10 miles of the clinic were 37,160 (84.6%), 42,336 (96.4%), and 43,399 (98.8%), respectively. No seasonal variation in the number of visits was observed. Male patients visited the clinic 23,742 times (52.3%) and the patients' median age was 3 years (interquartile range, 1–6). Most visits occurred on Mondays, and 5643 (15.2%) and 4790 (12.9%) patients visited the clinic when consultations began at 10 AM and 3 PM, respectively. Approximately 20% of weekday visits occurred after 6 PM, when other pediatricians' offices were typically closed. Children older than 7 years of age visited the clinic more frequently after 6 PM. The overall median waiting time was 650 seconds (interquartile range, 429–1020). The 3 most common diagnoses were upper respiratory tract infection (27,173), asthmatic bronchitis (23,744), and allergic rhinitis (10,556). The number of individuals who were referred to other medical institutions was 284 (0.6%).

The majority of patients were children aged 1 to 4 years living near the clinic and 80% of visits were during the daytime. However, children older than 7 years of age visited the clinic more frequently after 6 PM. The convenience of the clinic contributed to the fulfillment of the medical needs of children with mild illnesses whose mothers were in full-time employment.

Abbreviations: IQR = interquartile range, MHLW = Ministry of Health, Labour, and Welfare.

Keywords: after-hours accessibility, convenient care clinic, Japan, pediatrics, railway network, retail clinic, working mothers

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1. Introduction

In Japan, more than half of mothers with children older than 4 years of age are employed, and the number of double-income households exceeded 11 million in 2014.^[1] Further, the proportion of women aged 30 to 34 years participating in the labor force increased from 43.9% in 1975^[2] to 71.2% in 2015^[3], and resignation because of marriage or pregnancy has shown a downward trend. However, in 2010, the proportion of mothers aged 30 to 49 in full-time employment was only 37.3%, which is low relative to those observed in Western countries (eg, 46% in the United States and 64.3% in Sweden).^[4] As women make more advances into society in the future, the number of working mothers with full-time jobs is expected to increase further. Therefore, it is necessary to provide a medical provision system that is friendly for working mothers with sick children, because sudden illness in their children is one of their most serious concerns.^[5]

However, in the current medical provision system, if working mothers return home from work at night and notice that their children are ill, they have little choice but to visit an emergency

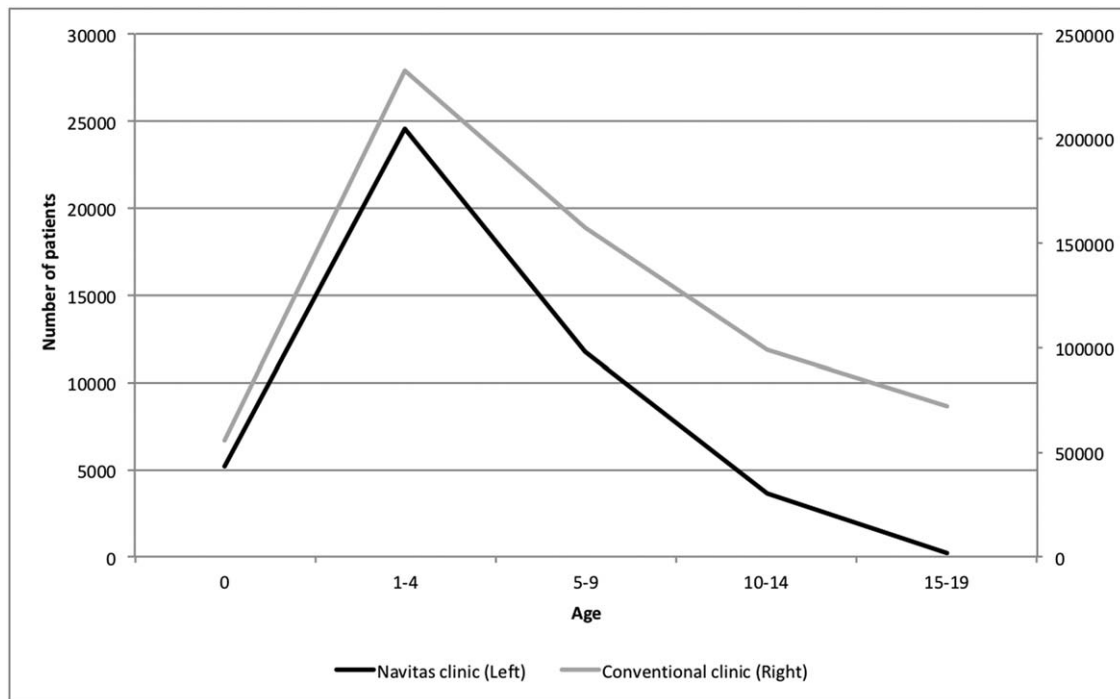


Figure 1. The number of pediatric patients by age groups in Navitas Clinic and conventional clinics^a in Japan. ^aData of conventional clinics were extracted from the Patient Survey published in 2014 by the Ministry of Health, Labour, and Welfare.

department. These low-acuity emergency department visits have become a widespread problem in hospitals in Japan and other countries. To resolve this issue and increase the convenience of medical visits, we have focused on an extensive railway network in metropolitan Tokyo. The railway network of Tokyo is unparalleled, and train stations are no longer just a place through which to pass.^[6] Our clinic, Navitas Clinic Tachikawa, was the first convenient clinic established in Japan and is similar to retail clinics in the United States. It is located inside a hub station in Tokyo, is open at night and on weekends, and offers greatly improved access to care, particularly for busy young workers, as reported previously.^[6]

Because children are usually accompanied by their mothers when visiting a doctor, the practice pattern followed by the department of pediatrics at the convenient care clinic supports working mothers with children. However, the extent of the demand for these services has not been elucidated thus far. Therefore, the present study examined the characteristics of patients visiting the pediatric department of the clinic, which was characterized by locational and temporal convenience.

2. Methods

Tachikawa city has a population of 180,000 and is located in the center of Tama area, which has a population of 4 million. Tachikawa station is a gateway to the city, at 30 minutes by express train from central Tokyo. Navitas Clinic Tachikawa is located in Tachikawa station, which connects 3 railways and is a 1-minute walk from the nearest ticket gate. The clinic is open from 9 AM to 1 PM and from 3 PM to 8 PM on weekdays, and from 10 AM to 5 PM on Saturdays. One pediatrician usually operates the pediatric department.

We obtained anonymous data for patients who had visited the pediatric department at the clinic between August 2013 and June 2016, using electronic health and billing records. We retrospectively extracted data regarding patients' sex, age, time of visit, waiting time, presence or absence of an appointment, diagnoses, and patients' addresses. For obtaining consent, an opt-out approach was applied because this is an observational, non-interventional study and approved by the institutional review board at Teikyo University, Tokyo, Japan.

Data regarding other medical services, such as immunization for seasonal influenza or visits to the department of dermatology, were not included in the analysis. Data for the period from September 6, 2015 to October 12, 2015, were unavailable because of changes in electronic health record vendors; therefore, they were excluded from the analysis. Rates of referral to other medical institutions were calculated for each patient rather than each visit. To compare the data with those of conventional clinics in Japan, publicly available data were used to obtain statistics for patients' characteristics in conventional Japanese clinics, which were published by the Ministry of Health, Labour, and Welfare (MHLW) in 2014.^[3]

Statistical analyses were performed using R version 3.3.3 (R foundation for Statistical Computing, Vienna, Austria). A Kruskal–Wallis test was used to examine associations, and *P*-values of <.05 indicated statistical significance. Patients' addresses were plotted on the map using MapInfo (Pitney Bowes Software K.K., Tokyo, Japan).

3. Results

During the 34-month study period, 8091 patients attended the clinic, with a total of 45,388 visits. The average numbers of daily

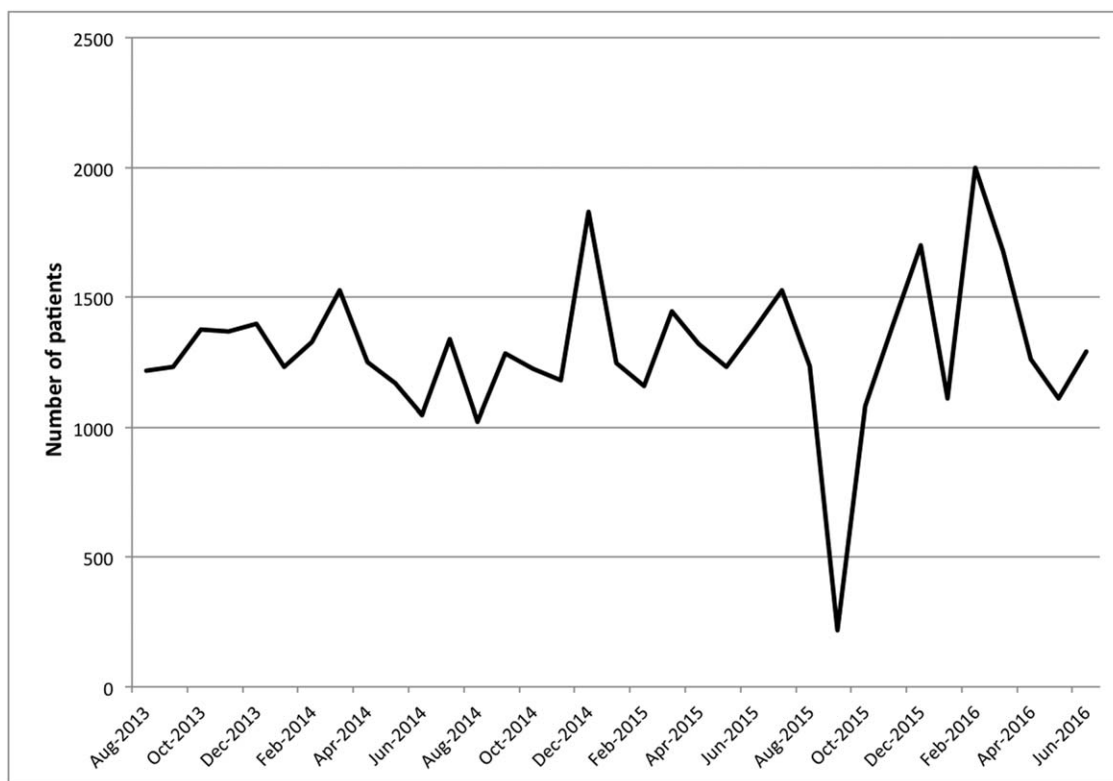


Figure 2. Number of monthly visits to Navitas Clinic. The data between September 6, 2015, and October 12, 2015, were not available because of the changes in the electronic health record vendors and were not included in the analysis.

visits on weekdays and Saturdays were 53.5 and 57.1, respectively. Male patients visited the clinic 23,742 times (52.3%), and their modal and median ages were 1 and 3 years (interquartile range [IQR], 1–6), respectively. As shown in Figure 1, there was a lot of visit of children aged 1 to 4 years in our clinic compared with conventional Japanese clinics.

The overall median waiting time was 650 seconds (IQR, 429–1,020). Median waiting times for the 15,679 (35.3%) patients without an appointment and 28,720 (64.7%) patients with an appointment were 814 seconds (IQR, 503–1,395) and 590 seconds (IQR, 400–877), respectively. The proportion of patients who waited <15, 15 to 30, 30 to 60, and >60 minutes were 69.0%, 22.9%, 7.0%, and 1.2%, respectively.

There was no seasonal variation in the number of visits (Fig. 2). The average numbers of patients per month in winter (December, January, and February), summer (June, July, and August), and the other seasons were 1,444, 1,257, and 1,315, respectively.

The distribution of visits varied according to the day of the week (Fig. 3). The numbers of visits on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, and Saturdays were 65.9 (20.2%), 53.9 (16.5%), 46.9 (14.4%), 53.6 (16.5%), 48.3 (14.8%), and 57.1 (17.5%), respectively.

Figure 4 (left) shows the number of weekday visits according to the time of day throughout the study period. In addition, 5643 (15.2%) and 4790 (12.9%) patients visited the clinic when consultations began at 10 AM and 3 PM, respectively. Approximately 20% of weekday visits occurred after 6 PM, while other pediatricians' offices were typically closed. Figure 4 (right) shows the proportions of visits that occurred before and after 6 PM on weekdays according to age. As children grew older, they visited the clinic after 6 PM more frequently.

Common diagnoses included upper respiratory tract infection (27,173), asthmatic bronchitis (23,744), allergic rhinitis (10,556), gastroenteritis (4732), eczema (3558), asteatotic eczema (2336), influenza (1918), nasal obstruction (1772), emesis (1361), and allergic conjunctivitis (1053). The median and modal numbers of times patients visited the clinic were 3 and 1, respectively. Only 103 (1.3%) patients visited the clinic more than once per month on average, and 284 (0.6%) were referred to other medical institutions.

Figure 5 shows geographical plots of the patients' residence locations ($n = 43,932$), the clinic, and the surrounding railway network. The numbers of patients who lived within 2, 5, and 10 miles of the clinic were 37,160 (84.6%), 42,336 (96.4%), and 43,399 (98.8%), respectively.

4. Discussion

This study examined the demographic characteristics of patients visiting the pediatric department at the clinic. The majority of patients were children aged 1 to 4 years probably because locational convenience might have attracted mothers with small children.

Further, patients visiting the pediatric department lived nearer to the clinic relative to those who visited the internal medicine department; the proportions of patients living within 2 miles of the clinic who visited the pediatric and internal medicine departments were 84.6% and 50.6%, respectively.^[6] The address of the pediatric patients may be an indication of the range in which mothers are easily able to travel with their children for an unexpected appointment and mothers would be unwilling to use crowded trains in metropolitan areas of Tokyo to visit a clinic

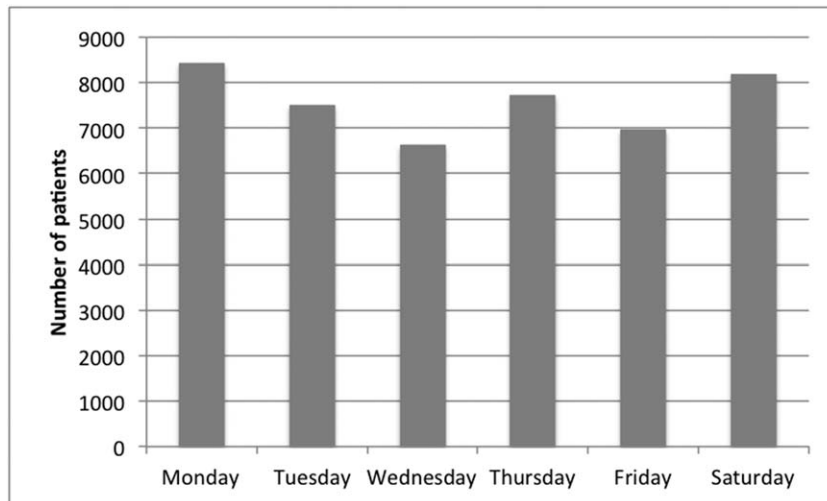


Figure 3. Number of daily visits to Navitas Clinic based on the day of the week.

with their children. Although, some people visited the clinic from some distance along the railroad track, and the railway network could have been an inflow route for pediatric patients, the effect size was not as large as that observed for internal medicine.

In our pediatric department, 80% of visits were during the daytime probably because mothers with small children might have worked on a part-time basis.^[7] Meanwhile, children who were older than 7 years of age visited the clinic most frequently after 6 PM. This could have occurred because many mothers return to full-time employment once their children enter elementary school. Therefore, they might have noticed that their children were unwell upon their return from work and taken them to the clinic at night. This is consistent with the results of a study conducted in 2009, which showed that the proportions of mothers who had children aged 0, 1 to 3, 3 to 6, 7 to 12, and >13 years and desired full-time work without overtime were 5.7%, 16.7%, 29.2%, 42.1%, and 54.6%, respectively.^[7]

Although the number of visits to the internal medicine department increased during winter,^[6] this trend was not observed in the pediatric department. Admittedly, most upper respiratory tract infections are cured without medication, but parents' need for pediatric appointments has increased in Japan. Although the number of children aged 0 to 14 in the population decreased from 18.1 million to 16.2 million from 2002 to 2016,^[8]

the number of outpatient visits increased from 635 100 to 738 600 from 2002 to 2014.^[9] Further, of 251,120 children who visited emergency medical institutions in Tokyo at night and during holidays in 2012, 234,331 (93.3%) did not have severe conditions requiring hospitalization.^[10] Our clinic opens at night and could contribute to a reduction in emergency visits to other institutions located in surrounding areas; however, further research is required to clarify this.

Because waiting in a clinic for long periods with a small child is a significant burden for mothers, the reduction of waiting times is important. According to a patient behavior survey published by the MHLW in 2014, the proportions of patients who waited for <15, 15 to 30, 30 to 60, and >60 minutes in hospitals were 25%, 24.1%, 20.4%, and 24.7%, respectively,^[11] and waiting times in our clinic were comparatively short, because the majority of patients presented with uncomplicated illnesses that required only short examination times. In addition, we provided a sophisticated reservation system, which was used in the internal medicine department at the clinic and included an automated Internet web service.^[6]

The study was subject to several limitations, as shown in a study of the internal medicine department.^[6] For example, the study was observational and conducted at a single institution. In addition, we compared patient characteristics to data for

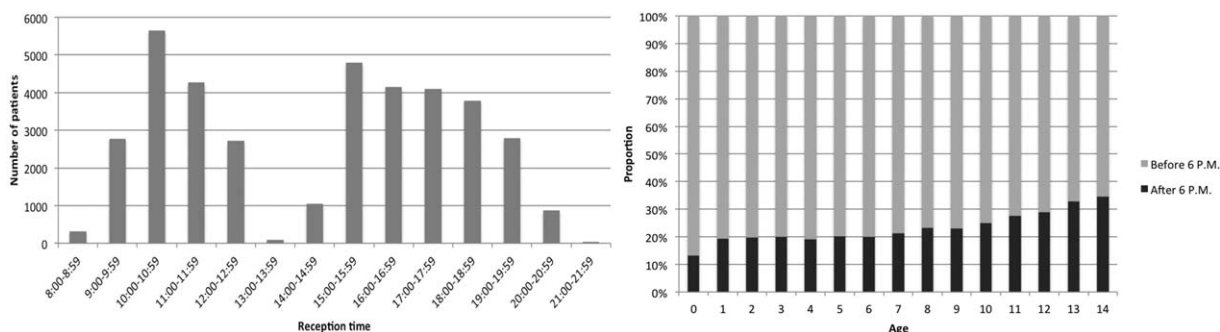


Figure 4. Number of weekday visits to Navitas Clinic based on the time of the day. Left: The numbers of weekday visits are shown for males and females. Right: The proportion of visit before and after 6 P.M. on weekdays by age.

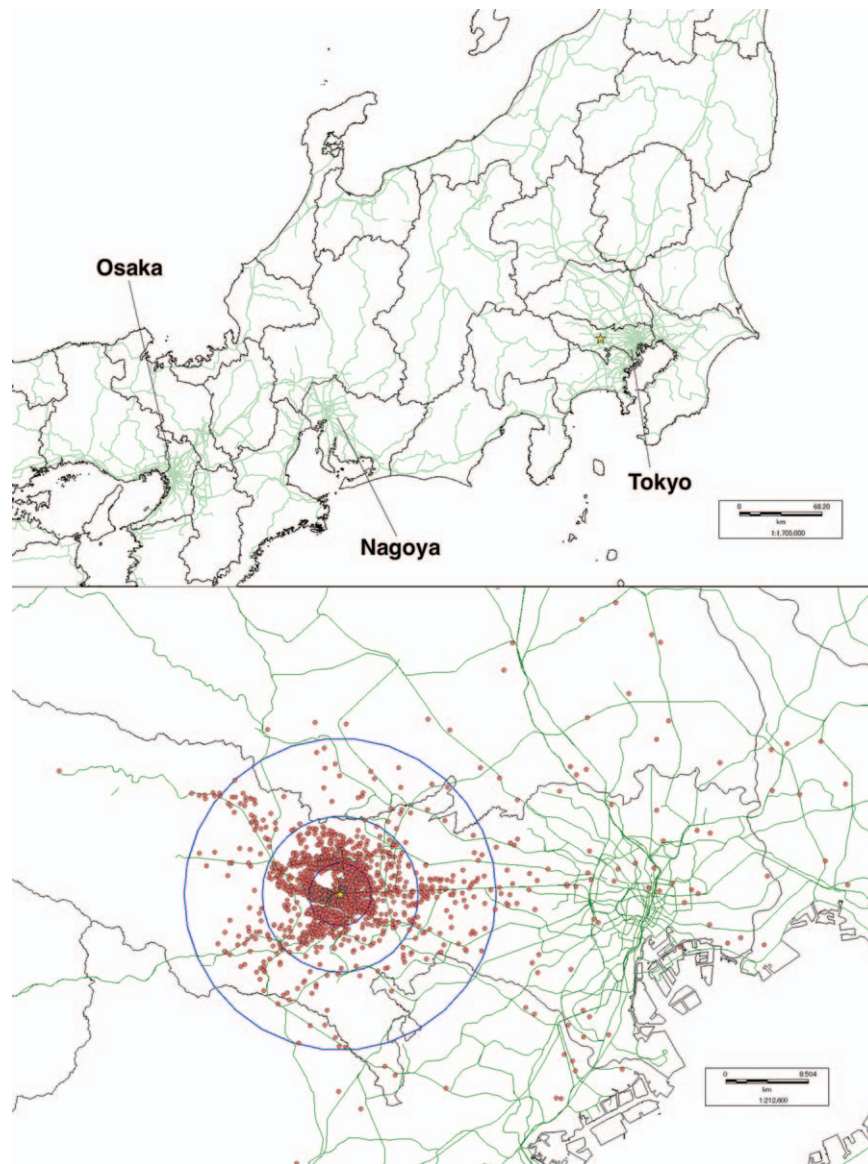


Figure 5. Addresses of pediatric patients and the railroad network around Navitas Clinic. Upper: Map of Tokyo and surrounding areas. Lower: Magnified map around Tachikawa City in Tokyo. The yellow star indicates the location of Navitas Clinic Tachikawa; the green lines indicate the railway network; the red points indicate patients' addresses; the blue circles indicate 2, 5, and 10-mile radius from the clinic.

conventional clinics, obtained from a nationwide survey of Japanese patients, because we could not obtain data from other clinics in the region. Further, the diagnoses were based on the terminology used in health insurance claim forms, and the actual medical conditions might have differed from this in some cases.

5. Conclusion

This observational study of more than 45,000 patient visits in Tokyo revealed that the majority of patients are children aged 1 to 4 years living near the clinic and 80% of visits were during the daytime. However, children older than 7 years of age visited the clinic more frequently after 6 PM. These demographic characteristics could reflect the working patterns of mothers, in that they tend to hold part-time jobs when their children are young and return to full-time work once children enter elementary school. The convenience of the clinic contributed to the fulfillment of the

medical needs of children with mild illnesses at night and the realization of a comfortable society in which the number of mothers in full-time employment will increase in future.

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