

Analysis of the disease spectrum of pediatric outpatient and emergency in the Fenhu area of the Yangtze River delta from 2016 to 2020.

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Abstract

Purpose: By analyzing the disease spectrum and distribution characteristics of pediatric outpatient and emergency patients in the Fenhu area of the Yangtze River delta from 2016 to 2020, it can provide guidance for the treatment and prevention of local children's diseases.

Methods: According to the disease categories of the International Classification of Diseases (ICD-10), the main diagnoses of 236,977 outpatient and emergency cases from 2016 to 2020 were classified and analyzed by descriptive statistics.

Results: There were more males than females, with a ratio of 1.24:

- The age of onset was concentrated in infancy and preschool age (73.46%). The number of outpatient and emergency departments was basically the same from 2016 to 2019, and decreased significantly in 2020;
- Pediatric outpatient and emergency visits were mainly concentrated in the fourth quarter, and respiratory system diseases had obvious seasonal distribution characteristics;
- Fever of unknown origin was the most common first diagnosed disease (69.6%), and respiratory system disease (58.1%) was the most diagnosed disease type, ranked first in each year, but the disease composition ratio showed a downward trend year by year, and infectious diseases rose the fastest.

Conclusion: In the past five years in the Fenhu area of the Yangtze River delta, respiratory diseases in pediatric outpatient and emergency children are still the top priority of prevention and control, and secondly, attention should be paid to infectious diseases that increase year by year.

Keywords: Pediatrics, Outpatient and emergency department, Disease spectrum, Changing trend.

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Introduction

With the continuous improvement of children's healthcare services and the improvement of people's living standards, the types and composition of childhood diseases have changed. In addition, the COVID-19 epidemic has also affected children's healthcare-seeking behaviors. As disease spectrums vary across regions, understanding local patterns of pediatric outpatient and emergency department diseases can facilitate the rationalization of clinical practices, the allocation of medical resources, and the effectiveness of disease prevention and control efforts. In this study, we conducted a survey and analysis of pediatric outpatient and emergency department cases in the Fenhu region of the Yangtze River Delta from 2016 to 2020 and the results are reported below.

Materials and Methods

Using the hospital's electronic medical record information system, we extracted data on pediatric outpatient and

emergency department visits in the Fenhu region of the Yangtze River delta from January 1, 2016 to December 31, 2020. Based on the disease categories in the International Classification of Diseases, tenth revision (ICD-10), we classified the first diagnosis of each patient and set the search criteria for the primary diagnosis to include disease name, age, gender, and visit time.

We conducted a descriptive analysis of the collected data, examining changes in disease patterns over the years and the frequency distribution and composition ratio of each disease by age, gender, and season. The seasons were divided into four quarters, with each quarter comprising three months. Children who visited the outpatient and emergency department were divided into five stages based on commonly used age divisions for children: Newborn period, infant period, toddler period, preschool period, and school-age and adolescent period.

We performed preliminary data processing using Excel software and conducted statistical analyses using SPSS 25.0

Results

software. For non-normally distributed continuous variables, we used the median (interquartile range) (M (P25, P75)). The composition ratio was used to represent count data.

Basic information

From 2016 to 2020, a total of 236,977 pediatric patients were treated in the outpatient and emergency departments. Of these patients, 131,124 were male and 105,853 were female, resulting in a male-to-female ratio of 1.24:1. The number of male patients treated each year was consistently higher than that of female patients. The toddler period and preschool period were the ages most susceptible to illness, accounting for over half of the total number of patients (58.5%). In terms of the annual distribution of diseases, there were 43,994 patients treated in 2016, 57,989 in 2017, 51,896 in 2018, 56,325 in 2019, and 26,773 in 2020 after the outbreak of the pandemic. The number of patients treated in 2020 significantly decreased compared to the pre-pandemic years (annual decrease rate of 46.2% to 60.9%).

The quarterly changes in the number of pediatric outpatient visits

Over the 5-year period, the number of pediatric outpatient visits in the Fenhu region of the Yangtze River delta was mainly concentrated in the fourth quarter, with 72,252 visits accounting for 30.5% of the total number of visits. The first and second quarters were roughly equal, with 59,633 (25.2%) and 57,811 (24.4%) visits, respectively, while the third quarter had the lowest number of visits, with 47,278 (19.9%) visits. Among the top 5 diseases, respiratory system diseases exhibited a significant seasonal distribution, mainly in the fourth quarter. However, there was no significant difference in the seasonal distribution of the second to fifth ranked diseases.

Top 10 systemic diseases and their composition ratio

In the past five years, the top 10 systemic diseases in terms of frequency were respiratory system diseases, symptoms, signs and clinical and laboratory abnormalities, ophthalmic, otic, nasal, and pharyngeal diseases, digestive system diseases, infectious diseases, skin diseases and all congenital diseases, infectious and parasitic diseases, endocrine and metabolic diseases, and health checkups and preventive treatments. Respiratory system diseases ranked first, and nearly half (58.1%) of the pediatric patients visited local outpatient and emergency departments for respiratory system diseases. Symptoms, signs, and clinical and laboratory abnormalities were defined as diseases, including fever of unknown origin, abdominal pain and vomiting of unknown origin, and others. Fever of unknown origin accounted for 69.6% (35,774 cases) of this type, abdominal pain of unknown origin accounted for 16.0% (8,361 cases), and vomiting of unknown origin accounted for 13.8% (7,209 cases).

Changes in the order of pediatric outpatient and emergency department diseases

From 2016 to 2020, the top three diseases in terms of frequency among pediatric outpatients and emergency department patients in the Fenhu area of the Yangtze River delta were respiratory system diseases, symptoms, signs and clinical and laboratory abnormalities, and ophthalmic, otic, nasal, and pharyngeal diseases. Respiratory system diseases ranked first every year but showed a decreasing trend in their composition ratio from 53.3% in 2016 to 46.2% in 2020. Infectious diseases showed an increasing trend, ranking fourth in 2020, up from eleventh in 2016, with a composition ratio increasing from 0.28% to 10.98%. In 2019 and 2020, infectious diseases ranked fourth, and digestive system diseases dropped to the fifth rank. The composition ratios of other disease categories fluctuated only slightly over the five-year period (Table 1).

Disease	Total cases (n)	Rank	2016 (n)	Rank	2017 (n)	Rank	2018 (n)	Rank	2019 (n)	Rank	2020 (n)	Rank
Respiratory system	140082	1	4824	1	33112	1	30499	1	35697	1	15950	1
Symptoms, signs, clinical and laboratory abnormalities	52140	2	13414	2	13414	2	12323	2	11000	2	6461	2
Eye, ear, nose, throat and other diseases	40514	3	7224	3	9979	3	9147	3	9932	3	4247	3
Digestive system diseases	3242	4	3242	4	5568	4	4009	4	4780	5	2231	5
Infectious diseases	15148	5	134	11	460	6	1816	5	9050	4	3788	4

Skin diseases and allergies	3965	6	643	5	825	5	1056	6	857	6	584	
Neonatal diseases	1661	7	321	6	287	8	402	8	316	7	335	
Infectious diseases and parasites	1366	8	290	7	358	7	456	7	203	9	312	12
Endocrine and metabolic diseases	1182	9	234	8	257	9	208	10	266	10	177	8
Health examination and preventive treatment	995	10	233	9	224	10	236				221	9
Urinary and reproductive system	835	11	175	10	146	11	169	11	139	10	206	10
Hematologic system	405	12	129	12	65	13	61	12	63	13	84	11
Nervous system	391	13	83	13	101	12	84		68	12	55	13
Circulatory system	67	14	8	14	11	14	11	14	13	14	24	14
Physiological and physical disorders caused by poisoning, trauma, insect bites, burns, etc.	23	15	6	15	1	16		16	2	16	11	15
Rheumatic and immune disorders, muscular and neoplastic disorders	13	16	0	16	5	15	4	15	3	15	1	17
Other	13	17	0	16	1	16	0	17	2	16	10	16

Table 1. Pediatric outpatient and emergency department disease spectrum and ranking changes from 2016 to 2020.

Discussion

Among the children admitted to the pediatric emergency department, boys outnumbered girls at a ratio of 1.24:1, which is consistent with the data reported in the literature [2,3]. The number of pediatric emergency department visits remained relatively stable from 2016 to 2019, but there was a significant increase in the number of visits in 2020 after the outbreak of the COVID-19 pandemic at the end of 2019 in the region. This suggests that the behavior of seeking medical care for children has changed due to the impact of the COVID-19 pandemic. There are several possible reasons for this change.

First, due to epidemic control measures, children's home isolation, reduced outdoor activities, and decreased contact opportunities have led to a significant decrease in common respiratory diseases.

Second, rational medical care by parents. During the epidemic, parents are more likely to choose home observation for children with mild illnesses because they are concerned about cross-infection in hospitals and home isolation.

Third, the emergence of a new model of medical treatment. For postoperative follow-up and children with chronic diseases, the new medical development model of "Internet +" in the pediatric

field has played a positive role in reducing opportunities for cross-infection in offline visits [4,5].

This study shows that the peak month for pediatric emergency department visits in the Fenhu area of the Yangtze River delta is the fourth quarter, and the low point is the third quarter. There are significant regional differences in the flow of patients to emergency departments in different regions [6,7]. Among them, there are significant seasonal distribution differences in respiratory diseases, which are consistent with the characteristics of the disease. From October to December each year, the Fenhu region should reasonably optimize and allocate medical resources to ensure the demand for pediatric emergency department visits in the area.

Regional differences in the distribution of diseases are apparent, but the common diseases within a specific region are relatively stable. Similar to other studies [1,8], respiratory diseases are the main illnesses affecting children's health in the local area. The next most common diseases are those that cannot be classified, Ear, Nose, and Throat (ENT) and oral diseases, digestive system diseases, and infectious diseases [9]. The age of onset is mainly concentrated in the preschool and early school-age periods, which is related to the immaturity of the respiratory system and lower physiological immune function, making children more susceptible to respiratory and digestive system diseases. At the same time, children of this age are in the stage of growth and development, have a strong curiosity for new things, and have poor abilities to avoid dangerous things [10].

Therefore, measures such as strengthening the prevention and health care of diseases in preschool children, accident risk assessment, disease propaganda, and actively carrying out research and vaccination for various respiratory pathogens are needed [11]. Symptoms, signs, and clinical and experimental abnormalities are the second most common diseases in pediatric emergency departments. Children often cannot directly express their symptoms and usually seek medical attention for a particular symptom. Among the diseases with symptoms and signs that are unclear, fever is the most common symptom, involving multiple disciplines. According to this study, more than half of the children were hospitalized with this symptom (accounting for 50.2%). During the epidemic, it is necessary to identify the cause of fever and conduct a strict investigation of the epidemiological history, thereby screening and ruling out suspected cases of COVID-19.

This survey found that the top five diseases in the pediatric emergency department in the Fenhu area of the Yangtze River delta over the past five years have been consistent. Similar to other studies [9], respiratory diseases have always been the most prevalent disease in the pediatric emergency department, both before and after the epidemic, and require focused prevention and treatment. However, respiratory diseases also have the largest annual decline rate among diseases. Compared with 2016, the proportion of children with respiratory diseases in 2020 decreased significantly, making it the fastest declining disease among the local disease spectrum. The composition

and ranking of infectious diseases have changed the most. In the past two years, during the epidemic period, it has jumped to the fourth place in the pediatric emergency department disease spectrum, rising from the eleventh to the fourth place in the ranking compared with 2016, and the composition rate has increased from 0.28% to 10.98%.

Among infectious diseases, bacterial infections, Mycoplasma infections, and viral infections are the main types. Since doctors in the emergency department need to ensure both diagnostic accuracy and certain efficiency when receiving patients, many respiratory diseases are classified as infectious diseases, and there is some overlap between the two. However, diseases such as leukemia and herpes infections have also shown a certain upward trend, considering the impact of epidemic control and climate change, parents should strengthen their children's personal protection and vaccination.

Conclusion

In summary, pediatric emergency department patients exhibit both common regularity and particularity. Respiratory system diseases remain a top priority for disease control in the local area, especially during the winter, where preparedness for prevention and treatment and promotion of awareness is particularly crucial. Changes in infectious diseases also need to be taken seriously in the future. In addition, it is recommended to standardize the consistency of disease diagnosis by pediatric physicians in emergency departments, thereby improving diagnostic accuracy.

Declaration of Interest

The authors report no declarations of interest. The authors alone are responsible for the content and writing of the paper.

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Retraction Note