

Analysis and Countermeasures Research on Outpatient Clinic of Lishui Central Hospital from 2020 to 2023

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Abstract

This paper analyzes the trend and changes in outpatient volume at Lishui Central Hospital from 2020 to 2023 to provide scientific references for enhancing the quality of medical services. Data on hospital outpatient visits from January 2020 to December 2023 were gathered from the hospital's monthly workload statistics report and analyzed using the seasonal index method for time-series data. From 2020 to 2023, the number of outpatient visits showed an increasing trend, and the number of outpatient visits in 2023 is 1,777,291, which is 442,314 visits higher than the number of outpatient visits in 2020; the monthly seasonal index is the highest in December, which reaches 119.84%, and is in the "high season", and the lowest in February, which is 72.32%, and is in the "low season". The monthly seasonal index was highest in December at 119.84%, the "high season", and lowest in February at 72.32%, the "low season". By quarter, the seasonal indexes of the first and second quarters are less than 100%, and the seasonal indexes of the third and fourth quarters are more than 100%. Hospital outpatient volume is relatively stable, with an overall upward trend. In the day-to-day management of the hospital, the outpatient volume of "off-season" and "peak season" change characteristics, from strengthening the allocation of medical resources, improving the efficiency of diagnosis and treatment, strengthening the medical safety, providing patients with better quality medical services, to meet the growing demand of medical and health care for people.

Keywords

Outpatient volume; Time series analysis; Seasonal index; Hospital management

Outpatient clinic refers to the medical workers in a particular medical institution for members of the community who are not hospitalized to check, diagnose treatment, guidance, and prevention of disease in the form of medical services, hospital outpatient clinics need to receive patients with various types of illnesses, and at the same time to carry out a series of diagnostic and therapeutic work. The outpatient clinic is a crucial representation of the hospital, serving as the initial point of contact for patients. It acts as the driving force behind hospital construction and development and is also a key indicator of hospital operations and management [1]. Outpatient volume is the number of outpatients in a period of time, hospital outpatient volume not only reflects the scale of hospital operations and the quality of medical services, but also the financial status of the hospital, the allocation of medical resources, and the workload of the doctors, as well as the number of patients admitted to the hospital, etc., and its important influence [2]. By analyzing the outpatient consultation volume of Lishui City Central Hospital during the 4 years from 2020 to 2023, to understand the trend of outpatient consultation volume changes, to rationally allocate medical resources and formulate

work plans according to the changing law of outpatient consultation, to ensure the effectiveness and continuity of medical services, in order to promote the development of the hospital's constant and sustained improvement [3].

1. Information and methods

1.1 Sources of information

We collect the outpatient volume data of Lishui Central Hospital from 2020 to 2023 on a monthly basis. The information will be gathered from the monthly report of hospital workload statistics, ensuring the data's authenticity and reliability.

1.2 Research methods

Seasonal index analysis of time series data is used to analyze patterns and trends in outpatient visits [4]. The seasonal index method is based on the time series data presenting seasonal changes, using the arithmetic mean method to directly calculate the seasonal index of each month or season, so as to achieve the purpose of prediction. All the data will be imported into the Excel table to calculate the seasonal index of 2020-2023 outpatient volume, and the size of the seasonal index will reflect the pattern of change of outpatient flow in different time periods, so as to eliminate the influence of irregular factors. The formula for calculating the seasonal index is:

$$\text{Seasonal index (\%)} = \text{average for the same season (month)} / \text{average for the total season (month)} \times 100\%$$

The seasonal index is expressed as a relative number, generally fluctuating around 100% up or down, indicating the relative relationship of each season to the annual average [5]. If the index is greater than 100%, it indicates that the season is a high season and the number of outpatient visits in that quarter is higher than the annual average number of outpatient visits, and if the index is less than 100%, it indicates that the season is a low season, indicating that the number of outpatient visits in that quarter is lower than the annual average number of outpatient visits [6]. Line graphs were used to show the trend.

2. Results

2.1 Changes in the number of outpatient visits

The number of outpatient consultations in LICH has been increasing year by year, gradually increasing from 1334977 in 2020 to 1777291 in 2023, with an increase of 442314 outpatient consultations. Based on the raw data of outpatient visits of the hospital, the average outpatient visits of each month during the four years of the hospital were calculated separately. It can be concluded that the average monthly outpatient volume is low in January, February, and April, with the lowest average outpatient volume of 97,686 in February, and high average outpatient volume in July, August, November, and December (Table 1). During the period 2020-2023, the number of outpatient visits in the hospital fluctuated up and down in each month, and was generally stable with a steady upward trend, except for the first half of 2020, when it fluctuated more (Figure 1).

Table 1. Lishui Central Hospital Outpatient Visits of 2020-2023

Months	2020	2021	2022	2023	Sum	Average	Seasonal index
1	107,604	128,493	150,681	110,220	496,998	124,250	91.99
2	45,936	101,177	111,865	131,767	390,745	97,686	72.32
3	86,856	137,153	154,539	159,671	538,219	134,555	99.61
4	106,657	136,174	118,891	134,905	496,627	124,157	91.92
5	110,069	135,964	141,229	155,158	542,420	135,605	100.39
6	109,493	139,435	155,723	145,356	550,007	137,502	101.80
7	128,639	149,713	154,028	155,610	587,990	146,998	108.83
8	126,844	153,630	156,533	164,504	601,511	150,378	111.33
9	126,786	142,838	142,471	148,247	560,342	140,086	103.71
10	123,024	135,483	142,022	152,055	552,584	138,146	102.27
11	129,876	147,163	145,338	159,087	581,464	145,366	107.62
12	133,193	160,937	129,908	160,711	584,749	146,187	119.84
Sum	1,334,977	1,668,160	1,703,228	1,777,291	6,483,656	1,620,914	—
Average	111,248	139,013	141,936	148,108	540,305	135,076	—

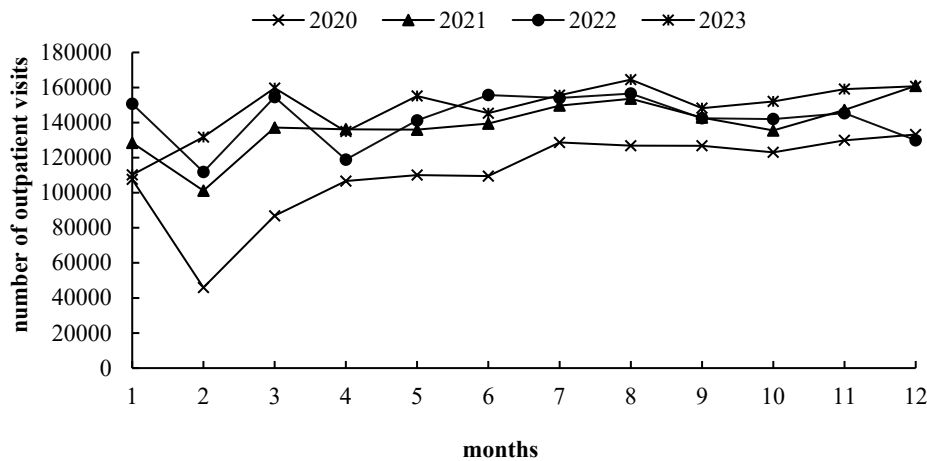


Figure 1. Changes in monthly outpatient visits to Lishui Central Hospital of 2020-2023.

2.2 Seasonal indices of outpatient visits

According to the formula for calculating the seasonal index, the seasonal index for each quarter is calculated separately, and it can be concluded that the seasonal index for the first quarter and the second quarter are smaller than the average level and that for the third quarter and the fourth quarter are larger than the average level. The seasonal index of outpatient consultation was the lowest in the first quarter, 87.97%, the number of outpatient consultations rebounded in the second and third quarters, and the number of outpatient consultations peaked in the third quarter, with a seasonal index of 107.95%, and the seasonal index decreased slightly in the fourth quarter, with a seasonal index of 106.04% (Table 2). The seasonal index for each month was calculated from the raw data in Table 1. The seasonal indices for May, June, July, August, September, October, November, and December were greater than 100%, which were the months with more outpatient visits, while the rest of the months had seasonal indices of less than 100%, which were the “low season” (Figure 2).

Table 2. Quarterly Outpatient Visits at Lishui Central Hospital of 2020-2023

Season	2020	2021	2022	2023	Sum	Average	Seasonal index
One	240,396	366,823	417,085	401,658	1,425,962	356,491	87.97
Two	326,219	411,573	415,843	435,419	1,589,054	397,264	98.03
Three	382,269	446,181	453,032	468,361	1,749,843	4,374,601	107.95
Four	386,093	443,538	417,268	471,853	1,718,752	429,688	106.04
Sum	1,334,977	1,668,115	1,703,228	1,777,291	6,483,611	405,226	—

3. Discussion

3.1 The number of outpatient visits has shown an increasing trend from year to year

The seventh national census in 2020 showed that Lishui's household population was 2.707 million, and the city's resident population was 2.507 million, with a continuous outflow of young people and a net outflow of population. Of the city's resident population, 400,000 people, or 16%, are aged 0-14; 1,574,000 people, or 62.8%, are aged 15-59; 533,000 people, or 21.2%, are aged 60 and above; and 385,000 people, or 15.4%, are aged 65 and above, in which the population is aging at a level higher than that of the average level in Zhejiang Province. Based on the growth of the total population size and the increase in the proportion of “one old and one small” population, the demand for health services in Lishui City will continue to grow slowly. As an indispensable public health institution in Lishui City, Lishui Central Hospital actively participates in the emergency response to public health events and plays a key role in the prevention and control of infectious diseases and the handling of public health emergencies, and is highly recognized by the residents. Keeping in mind the spirit and core values of “unity, dedication, innovation and

pragmatism”, Lishui Central Hospital always adheres to the service concept of “patient health-centered” to provide patients with the best quality services. From 2020 to 2023, the outpatient volume of the hospital has increased from 130,000 to nearly 180,000, and the annual outpatient consultation volume has shown a significant upward trend. Analyzing the reasons: (1) The hospital has strong strength in medical research, and can conduct research on actual clinical problems, solve major disease problems for patients with high efficiency, and win the high trust of patients. (2) The hospital has always adhered to the concept of people's health as the center to create a first-class international health management medical center for the whole life cycle, and the hospital's structural planning is further improved and innovated, and the environment of the patients' consultation has been improved. (3) The hospital has increased its efforts to build an intelligent hospital, improving the management efficiency, quality of medical services, and patients' medical experience through the use of advanced information technology and intelligent equipment.

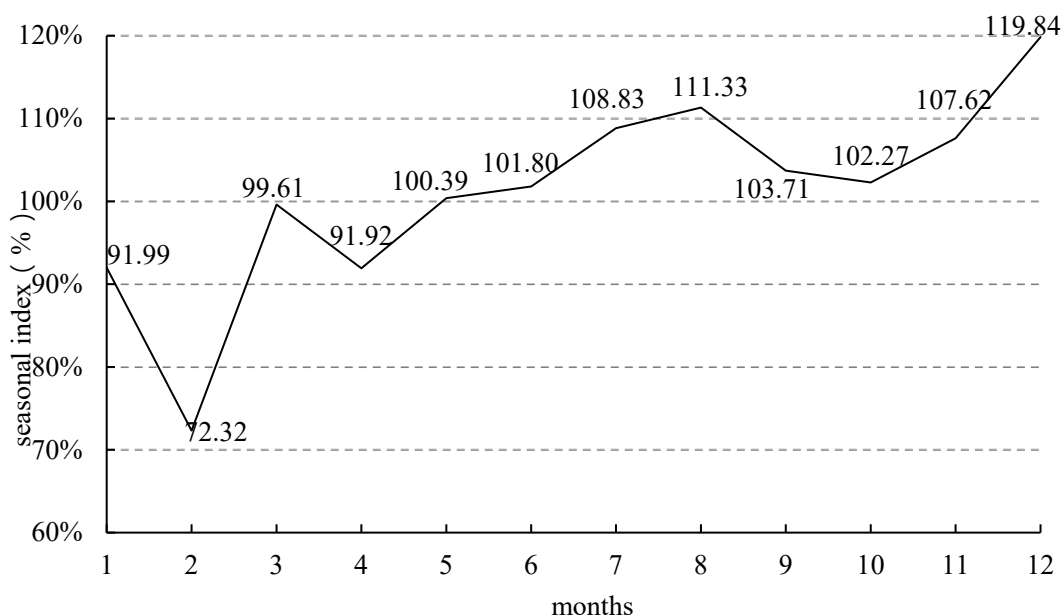


Figure 2. The trend of the seasonal index of outpatient visits by month in Lishui Central Hospital of 2020-2023.

3.2 Analysis of reasons for changes in outpatient visits by month and season

The seasonal index of outpatient visits was significantly below 100% in January, February, March, and April, and the seasonal index of outpatient visits in the first quarter was 87.93%, which was below the average for the year. 2020 outpatient visits showed a significant downward trend in January and reached the lowest level of the year in February, which was strongly related to the outbreak of neo-cresticercosis pneumonia at the end of 2019, and with the increase in the number of cases of neo-cresticercosis pneumonia, the number of hospital visits were significantly impacted [7]. Similarly, the excessively low outpatient visits in December 2022 and January 2023 are also related to the outbreak, as many non-New Crown patients avoided hospitals due to public fear of the outbreak and the quarantine measures taken by the government, leading to a significant drop in hospital visits. The number of patients seen in February 2021-2023 is at a low level relative to the number of patients seen throughout the year. The low level is due to the fact that there are only 28 or 29 days in February, which is the month with the fewest number of days in the month for the entire year, and the additional reason of New Year's vacation, which will result in a corresponding decrease in the number of hospital visits, which is the main reason for the low seasonal index of outpatient visits in the first quarter. With the popularization of vaccination and the adjustment of epidemic prevention and control measures, the number of new coronary pneumonia cases gradually decreases, public confidence is restored, and the number of hospital visits begins to rebound. LCSH is located in an area where the epidemic is relatively mild and well-controlled, and the number of outpatient visits is relatively stable, showing a steady upward trend. The seasonal index of outpatient visits in March and May is almost equal to 100%, indicating that the number of outpatient visits in these two months is approximately equal to the average level of the year. Compared to the first quarter, the hospital's seasonal index of outpatient visits gradually increased to 98.03% in the second quarter. The number of hospital outpatient visits rose slowly from April to August, due to the high temperature and humidity of

the geographic environment in which it is located, in which people tend to lose their appetite and choose to eat cold and raw foods [8]. Coupled with the hot weather, people spend less time outdoors and rely excessively on air-conditioning to cool down. These unhealthy living and eating habits can easily lead to a decline in the body's immunity and diseases. In addition, July and August are summer vacation months, when parents and teachers focus on using summer vacation time to treat diseases that can be treated on an elective basis. From October to December, the change of the fall and winter seasons, the temperature gradually decreases and the humidity rises in the areas where the people are located, and the lower temperatures and higher humidity provide a suitable environment for viruses to multiply, making it easier to spread [9]. People gather more often in indoor places such as schools and offices, and these closed environments provide a convenient way for viruses to spread, and immunocompromised people are prone to common illnesses such as cardiovascular and cerebrovascular diseases and respiratory illnesses, leading to a peak in outpatient visits in December. As a result, the number of outpatient visits in the third and fourth quarters was higher than the average for the year due to the environmental climate and holidays, and the seasonal index of outpatient visits was greater than 100%.

3.3 Responses and recommendations

3.3.1 Rational allocation of medical resources [10]

Lishui Central Hospital, as a leading regional hospital, should develop appropriate measures in advance to ensure that medical resources are effectively utilized during seasons and months of high population visits. For example, in the months of June, July, August, and other months with high outpatient volume, the time of concentrated vacation of medical staff should be minimized and the number of doctors, nurses, and other medical staff should be increased. In the hospital space configuration, will the same time period outpatient volume of departments placed in different spaces, will be different time period outpatient volume of departments placed in the same space, to maximize the use of hospital space resources, to achieve the clinic space of “light” “prosperous” “Complementary, so as to ensure the balance of the clinic space. In the use of medical equipment and processing to achieve fine management, the rational layout of equipment, to ensure that the space between the equipment is reasonable distance. Regularly train equipment operators to improve their operating skills and proficiency, and through the enhancement of professional skills, reduce operating errors and improve the efficiency of equipment use. Encourage interdisciplinary collaboration between different departments, share equipment resources to improve the efficiency of the use of equipment across departments, and reduce equipment idle time.

3.3.2 Optimizing the diagnosis and treatment process

During the peak period of outpatient consultation, in order to reduce the pressure of waiting in line at the scene due to high outpatient flow, hospitals should strengthen the promotion and implementation of the appointment system, publicize the appointment booking method through various channels, and increase the proportion of patients who book appointments. At the same time to increase the appointment channels and appointment time, so that patients can flexibly choose the consultation time according to their own needs. In addition to adopting measures such as booking appointments by time slots [11], shortening waiting time for outpatient consultation and simplifying the consultation process in order to reduce the waiting time of patients, and realizing the onlineization of services such as registration, payment and query through information technology means [12]. Full utilization of data from hospital information systems, Classification of symptoms related to common diseases, the formation of patient symptom characteristics, and the establishment of samples, in the patient's initial consultation registration, registration personnel can be based on the results of data analysis, guide patients to register effectively, rationally arrange the order of patient consultation, shorten the patient's waiting time for consultation, improve the efficiency of diagnosis and treatment [13].

3.3.3 Strengthening medical safety

During the peak period of outpatient service, hospitals should pay more attention to strengthening the professional training of relevant personnel on medical safety, regularly share typical cases of medical safety incidents, and enhance the ability of medical staff to identify medical risks [14]. In the course of medical treatment, patients' private information must be strictly protected, and a sound privacy protection system should be established to ensure that healthcare workers abide by the relevant regulations when dealing with patients' information and to prevent the leakage and misuse of information. Attention should also be paid to the health education of patients and health education should be carried out to raise patients' awareness of common diseases by organizing health lectures and free clinics and guiding them to have medical checkups and prevention in the off-season. Meanwhile, social media, official

websites, and other channels are used to popularize health knowledge, improve patients' health literacy, reduce the occurrence of medical accidents and disputes, strengthen the supervision and management of medical safety, and discover and correct medical errors and hidden dangers in a timely manner. A sound medical safety management system and operating procedures are established to standardize the diagnosis and treatment behaviors of medical personnel.

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