DISEASE PATTERN OF PATIENTS ATTENDING TWO DISTRICT HOSPITALS FOR EXAMINATION AND TREATMENT DURING THE YEARS BEFORE AND AFTER THE COVID-19 PANDEMIC

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Abstracts

The study employed a retrospective descriptive design, utilizing data from the health insurance reports at a district hospital in the Southern Vietnam (District AB), which was characterized by large urban remoteness, covering the years 2018, 2019 and 2020. The dataset included 352,881 patients during the outbreak period. Additionally, data were gathered from a Northern region hospital (District TO), located in the suburbs of a major urban area, spanning 5 years from 2019 to 2023, with a database of 411,189 patients recorded at the end of 2020 and the again in April 2022. The findings indicate that:(1) The overall disease structure according to 22 disease chapters in both hospitals, remained relatively stable, with minimal impact from the pandemic. District TO's suburban hospitals showed an increase in chapters IX and XI; (2) there were notable fluctuations in disease patterns in both inpatient and outpatient settings the Covid-19 epidemic. Specifically, the number of outpatients increased during the outbreak, while inpatients admissions significantly decreased. At AB hospital, outpatient visits surged in 2020 while inpatient admissions saw a steep decline, particularly among the top 10. The sharpest decrease reduction was observed in musculoskeletal and joint disorders. Three conditions experienced substantial decreases: gastroduodenitis (K29) fell by more than tenfold, from 6,269 cases to 607; asthma (J45) and atopic dermatitis (L20) also saw reductions of over 50%. At TO Hospital, the annual number of inpatients was relatively low, making the impact of the epidemic less apparent. Conclusions: The structure of the disease chapters according to ICD-10 remained largely unchanged throughout the study period. The Covid-19 epidemic led to a reduction the top 10 diseases among inpatients while increasing the volume of outpatients. Many conditions saw sharp declines in both outpatients and inpatients categories.

Keywords: *Disease pattern, ICD-10, COVID-19, outpatient, inpatient, musculoskeletal disorders, gastroduodenitis, asthma, atopic dermatitis, health insurance data.*

Mô hình bệnh tật của bệnh nhân đến khám và điều trị tại hai bệnh viện huyện trong những năm trước và sau đại dịch Covid-19

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Tóm tắt

Nghiên cứu sử dụng thiết kế mô tả hồi cứu với dữ liệu từ báo cáo bảo hiểm y tế tại một bệnh viện huyện ở khu vực miền Nam (huyện AB), nơi có đặc trưng xa các khu đô thị lớn vào các năm 2018, 2019 và 2020. Cơ sở dữ liệu gồm 352.881 bệnh nhân trong thời gian bùng phát dịch. Một bệnh viện

khác tại khu vực miền Bắc (huyện TO), là vùng ngoại ô của một khu đô thị lớn, có cơ sở dữ liệu với 411.189 bệnh nhân trong 5 năm từ 2019-2023, trong đó, dữ liệu ghi nhận tại thời điểm bùng phát dịch vào cuối năm 2020 và cuối tháng 4 năm 2022. Kết quả cho thấy: (1) Cấu trúc bệnh tật theo 22 chương bệnh của ICD-10 ở cả hai bệnh viện khá ổn định, và ảnh hưởng của đại dịch không được thể hiện rõ. Bệnh viện TO ở ngoại ô các thành phố lớn cũng ghi nhận thêm 2 chương bệnh nữa là chương IX và chương XI; (2) Biến động cấu trúc bệnh tật ở cả hai khu vực điều trị nội trú và ngoại trú trong bối cảnh dịch Covid-19: số lượng bệnh nhân ngoại trú khi đại dịch bùng phát có xu hướng tăng lên, ngược lại, số lượng bệnh nhân nội trú giảm đáng kể. Tại bệnh viện AB, xa thành phố, số bệnh nhân nội trú trong năm 2020 giảm so với các năm trước. Khu vực khám chữa bệnh ngoại trú tăng mạnh, trong khi khu vực điều trị nội trú giảm sâu, đặc biệt là các bệnh trong Top 10. Giảm mạnh nhất là bệnh lý cơ xương khớp - dây chằng khớp. Có 3 bệnh giảm mạnh, như viêm dạ dày - tá tràng (K29) giảm hơn 10 lần, từ 6.269 ca xuống còn 607 ca. Bệnh hen suyễn (J45) và viêm da cơ địa (L20) cũng giảm hơn một nửa. Tại bệnh viện TO, số bệnh nhân nội trú mỗi năm rất ít, vì vậy, tác động của đại dịch không rõ rệt.

Kết luận: Cấu trúc các chương bệnh theo ICD-10 gần như không thay đổi trong suốt thời gian nghiên cứu. Đại dịch Covid-19 đã làm giảm số lượng các bệnh hàng đầu của bệnh nhân nội trú và tăng số lượng bệnh nhân ngoại trú. Nhiều bệnh giảm mạnh ở cả bệnh nhân ngoại trú và nội trú trong giai đoạn này.

Từ khóa: *Cấu trúc bệnh tật, ICD-10, Covid-19, bệnh nhân ngoại trú, bệnh nhân nội trú, bệnh lý cơ xương khớp, viêm dạ dày - tá tràng, hen suyễn, viêm da cơ địa, dữ liệu bảo hiểm y tế.*

1. Introductions

The study was conducted at a district hospital (180 beds) in the Southern region (district AB), which was characterized by being far from a large urban area in three years 2018, 2019 and 2020 pandemic started in the Southern provinces (a total of 352881 patients) when the epidemic had not yet outbreaken , and a district hospital (50 beds) in the Northern region (TO district), which was a suburb of a large urban area in 5 years from 2019-2023 (a total of 411,189 patients) when the epidemic outbreaking at the end of 2020 and end of April 2022. Study design describes retrospectively. Using data in the Health Insurance report accounts for over 95% of the total number of people visiting hospitals. This is the official database of the hospital's medical examination and treatment situation. The results were analyzed according to the ICD10 and the 10 diseases with the highest prevalence (top10) in each region. Descriptive statistical calculations were used (mean, percentage) and statistical analysis using a non-parametric test compared the statistically significant difference with $p < 0.05$ (error $\alpha < 0.05$).

Objectives: 1) Describe the disease structure over 3 years of the whole hospital. 2) Analysis of fluctuations in disease structure in the two inpatient and outpatient areas in the years before and after the Covid-19 pandemic

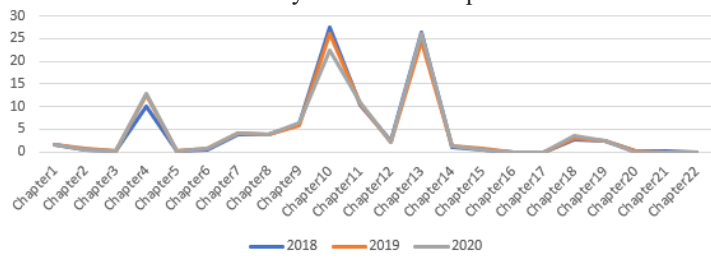
2. Research objects and methods

The study was conducted at a district hospital in the Southern region (district AB), which was characterized by being far from a large urban area in three years 2018, 2019 and 2020 (a total of 352881 patients) when the epidemic had not yet broken out, and a district hospital in the Northern region (TO district), which was a suburb of a large urban area in 5 years from 2019-2023 (a total of 411,189 patients) when the epidemic broke out at the end of 2020 and ended in 2020. End of April 2022. Study design describes retrospectively. Using data in the Health Insurance report accounts for over 95% of the total number of people visiting hospitals. This is the official database of the hospital's medical examination and treatment situation. The results were analyzed according to the ICD10 and the 10 diseases with the highest prevalence in each region. Descriptive statistical calculations were used (mean, percentage) and statistical analysis using a non-parametric test compared the statistically significant difference with $p < 0.05$ (error $\alpha < 0.05$).

3. Research results

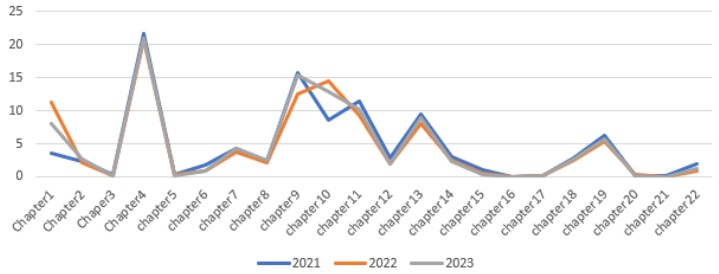
3.1. Structure of Disease Categories According to 22 Chapters (ICD-10, 2019) at Two Hospitals

Figure 1. Changes in the Distribution of 22 Disease Chapters (ICD10) over 3 years at AB Hospital



In the 3 years before the outbreak, the structure of diseases divided into 21 groups of the International Classification of Diseases (ICD10) was almost unchanged. Chapter IV - diseases of the endocrine, nutritional, metabolic system (10-12.9%), chapter X - respiratory diseases (22.3 to 27.4%) and chapter XIII - diseases of the musculoskeletal system account for the highest proportion.

Figure 2. Changes in the Distribution of 22 Disease Chapters (ICD10) over 5 years at TO Hospital



In 5 years, the structure of diseases classified into 21 groups of the International Classification of Diseases (ICD10) has remained almost unchanged. Chapter IV - endocrine, nutritional, metabolic diseases (11.9 to 15.3%), chapter X - respiratory diseases (8.6 to 15.7%) and chapter XI - digestive diseases (9.3 to 11.4%) accounted for the highest proportion. Chapter 13 diseases of the musculoskeletal system (8.1 to 10%). Chapter XIX. Wound poisoning and consequences of some external causes (4.6 to 6.2%).

Table 1. Fluctuations of the 10 most Common Diseases over 3 Years at AB Hospital

Outpatients (%)				Inpatients (%)			
ICD10	**2018**	**2019**	**2020**	**ICD10**	**2018**	**2019**	**2020**
E11	11012(17.4)	8596(13.8)	10380(10,5)	M15	5154(8,0)	4223(7,7	16(0,2)
J20	7990 (12.6)	7067(11.3)	6419(6.5)	M47	4832(7.5)	4131(7.7	294(3.1)
K29	6269 (9.9)	2807 (4.5)	607 (0.6)	J32	4480(7.0)	3451(6.4)	1(0)
J02	5959(9.4)	1978(3.2)	3286(3.3)	H10	3808(5.9)	2853(5.3)	1(0)
M25.5	3721(5.9)	3235(5.2)	7446(7.5)	M54	3589(5.6)	1677(3.1)	32(0.3)
I10	3478 (5.5)	2385(3.8)	3226(3.2)	J02	3420(5.3)	4550(8.5)	159(1.7)
H81	2689 (4.3)	2591(4.2)	2712(2.7)	J31	2569(4.0)	2154(4.0)	8(0)
J06	1851(2.9)	1132(1.8)	3251(3.3)	M25.5	2694(4.2)	1526(2.8)	120(1.2)
J45	1278(2.0)	896(1.4)	549(0.6)	M54.3	2125(3.3)	1660(3.1)	542(5.6)
L20	1229(1.9)	753(1.2)	580(0.6)	M13.0	2014(3.1)	1657(3.1)	9(0.01)
top10	41118 (65.0%)	28849 (46.2%)	38456 (38.7%)	top10	34685 (54.1%)	27882 (51.9%)	1182 (12.3%)
Total	**63.198**	**62.388**	**99.300**	**Total**	**64.165**	**53.751**	**9.629**

Comments: In outpatient clinics, the top 10 group accounts for a very large proportion. from 38.7% to 65%. Diabetes mellitus type 2 (E11) and Acute bronchitis due to Mycoplasma pneumoniae (J20.0) accounted for 17% of the total number of visits. The group of inpatients. accounting for 12.3% to 54.1% of the total. In 2020. the number of inpatient visits decreased sharply. while the number of patients visiting outpatient clinics increased (from 28849 to 38456). Among inpatients. bone and joint diseases (M13; M15.0; M25.5; M47.0 and M54) decreased the most (in 2018: 28.4% in 2019: 21.3% in 2020 decreased in both number and proportion: 4.6%). J32. J31 and H10 diseases are close to zero. The ratio of hospitalizations to the number of examinations in 2018 and 2019 is very high (34685/41118= 0.84 and 0.96). In 2020. this ratio is 9629/99300 = 0.097.

Table 2. Fluctuations of the 10 most Common Diseases over the Past 3 Years at TO Hospital

Outpatients (%)				Inpatients (%)			
ICD10	**2021**	**2022**	**2023**	**ICD10**	**2021**	**2022**	**2023**
E11	12698(22.4%)	1527(22.4)	14560(20.6%)	A97	85(2.3%)	1009(18.1%)	718(16.4%)
H81	852 (1.5%)	1003(1.5%)	1347(1.9%)	I10	78(2.6%)	72(1.3%)	62(1.4%)
H01.0	717 (1.3%)	910(1.3%)	1053(1.5%)	I50	72(2.4%)	58(1.0%)	77(1.8%)
I10	7943 (14.0%)	7578(11.1%)	9536(13.5%)	J02	44(1.5%)	184(3.3%)	82(1.9%)
J02	977 (1.7%)	1426(2.1%)	1667(2.4%)	J44	57(1.9%)	141(2.5%)	113(2.6%)
J20	2070 (3.7%)	4405(6.5%)	4087(5.8%)	K29	78(2.6%)	95(1.7%)	85(1.9%)
K29	2377(4.1%)	2196 (3.2%)	1829(2.6%)	K59	55(1.8%)	48(0.9%)**	57(1.3%)
M17	698 (1.2%)	113(0.2%)**	394(0.6%)**	N23	42(1.4%)	54(1.0%)**	41(0.9%)**
M47	1851 (3.3%)	1091(1.6%)	736(1.1%)	S01	52(1.7%)	44(0.8%)**	32(0.7%)**
Z34	762 (1.3%)	3(0%)**	405(0.6%)**	T78.1	45(1.5%)	60(1.1%)	26(0.6%)
top10	30945(54.6%)	20252(29.7%) 23905(35.1%)*	35614(50.4%) 38307(54.2%)*	top10	608(19.9%)	1765(31.7%) 2242(40.3%)*	1293(29.6%) 1480(33.9%)*
Total	**56626**	**68164**	**70724**		**3051**	**5566**	**4368**
New diseases in the top 10 during the outbreak							
A97		2251(3.3%)	1022(1.4%)	A90		278(5.0%)	
M54		1518(2.2%)	2470(3.5%)	A92		167(3.0%)	139(3.2%)
				A97.1		178(3.2%)	
				I63			58(1.3%)
				R10			89(2.0%)

*In top10; **Out of top10

Comments: In outpatient clinics. the top 10 group accounts for a very large proportion. from 35.1% to 54.6%. Among the ten most common diseases at outpatient clinics. 2 diseases accounted for the highest rate: diabetes mellitus (E11) from 20.6% to 22.4%. hypertension (I10) from 11.1% to 14.0% of the total number of outpatient visits and treatment. The group of inpatients. accounting for 19.9% to 40.3% of the total. The number of inpatients in the 2 years after the epidemic did not change significantly compared to 2021. The hospitalization/number of examinations ratio in all years is low (in 2021: 0.02; in 2022: 0.059; in 2023: 0.039).

4. Discussion

4.1. Temporal Fluctuations in the Structure of 22 Disease Chapters

For AB hospital: The disease structure divided into 22 groups of the International Classification of Diseases (ICD10) has remained almost unchanged over 3 years. Chapter IV - diseases of the endocrine. nutritional. metabolic system (10-12.9%). chapter X - respiratory diseases (22.3 to 27.4%) and chapter XIII - diseases of the musculoskeletal system account for the highest proportion. Followed by the groups of diseases of the eye (VII). ear (VIII).

circulatory system (IX). trauma. poisoning (XIX). skin and subcutaneous tissue diseases (XII). genital-urinary diseases (XIV). and other abnormalities (XVIII). For TO hospitals: In 22 chapters of Chapter IV - endocrine. nutritional. and metabolic diseases (17.7% to 21.6%). Chapter IX - Diseases of the circulatory system (11.9% to 15.8%). Chapter X - respiratory diseases (8.6% to 15.7%) and Chapter XI - diseases of the gastrointestinal system (9.3% to 11.4%) and Chapter XIX - Poisoning wounds and consequences of some external causes (4.6% to 6.2%). All other chapters are below 10%. Compared with the disease structure at provincial hospitals in the same period [1]. among the top 3 diseases in district hospitals. at the provincial level. there are 2 groups of respiratory diseases (5th) and circulatory diseases (3rd). The results in 2 district hospitals showed that the disease structure of all outpatient and inpatient cases was quite similar in terms of common diseases. namely chapter IV. chapter XIX. chapter X and chapter XIX. TO district hospital has an additional chapter XI. This data helps health managers at the district level to organize medical examination departments and clinical departments in accordance with their needs.

4.2. The Effects of the Covid-19 Pandemic on the Disease Structure of Ten Common Diseases

In Vietnam, the epidemic broke out in the Southern provinces earlier than in the North so in 2020 AB district hospital was affected by the epidemic. but in 2021 the epidemic broke out in the Northern provinces and ended in April 2022. The impact of the epidemic was analyzed on the same group of common diseases (top 10) and there were also differences between the South and the North. The psychological impact of fear of the epidemic at hospitals where patients and people who have been exposed to Covid-19. along with the anti-epidemic regulations of the MoH at that time only allowed the reception of emergency and serious cases. all the reasons mentioned had a change in both flow (number of patients) and type of disease (structure) in the two areas. inpatient department and medical examination department. At AB Hospital: The ten most common diseases at the clinic/ outpatient are: diabetes, acute bronchitis, gastroduodenitis, acute pharyngitis, joint pain, heart failure, vestibular dysfunction, upper HH tract inflammation, asthma, atopic dermatitis. Considering that the diseases with the highest incidence in 2018 were monitored in 2019 and especially compared to 2020, the results in Table 2 show: Outpatient group, the 10 most common diseases under the impact of the pandemic in 2020 the outpatient group decreased from 54% to only 12%. Mainly diseases Some diseases coming to outpatient treatment increased such as: joint pain (M25.5) and acute upper respiratory infection (J06) increased by approximately 2 times (3721 to 7446 and 1851 to 3251 cases). Other diseases have not changed much. For inpatients. in 2020. all the top 10 disease codes decreased. this ratio decreased to 0.03. The sharpest decline was the H10 disease codes; J31; J32; M13; M15; M54. There were 3 diseases that decreased a lot: such as gastroduodenitis (K29) decreased by more than 10 times. from 6269 cases to 607 cases. asthma (J45) and atopic dermatitis (L20) also decreased by more than half.

At TO Hospital. data was collected when the epidemic began to spread strongly from 2021 and early 2022. From April 2022 to the end of 2023 is the post-epidemic period. In outpatient clinics. the top 10 group accounts for a very large proportion. from 35.1% to 54.6%. Among the ten most common diseases at outpatient clinics. 2 diseases accounted for the highest rate: diabetes mellitus (E11) from 20.6% to 22.4%. hypertension (I10) from 11.1% to 14.0% of the total number of outpatient visits and treatment. Unlike AB Hospital. in general. there has not been a significant impact of the pandemic on the structure of diseases in the top 10. The group of inpatients. accounting for 19.9% to 40.3% of the total. The number of inpatients in 2021 is the lowest. showing the impact of the epidemic. 2 years after the epidemic. the number of inpatients increased compared to 2021. The epidemic of fever caused by infusion has slightly changed the list of top 10 diseases in the post Covid-19 period.

4.3. Hospitalization/number of Examinations and Hospitalizations and the Impact of the Pandemic

At AB Hospital, the hospitalization ratio to the number of examinations in 2018 and 2019 was very high (34685/41118= 0.84 and 0.96). In 2020, this ratio decreased sharply: 9629/99300 = 0.097. The results showed that the epidemic reduced the number of inpatient treatments very strongly. At TO Hospital, the ratio of hospitalizations/visits in all years is low (in 2021: 0.02; in 2022: 0.059; in 2023: 0.039). This result shows that after the epidemic, the ratio of hospitalizations to outpatient visits has gradually increased. The results in tables 1 and 2 also show a huge difference between suburban hospitals and hospitals located far from the city: in the total number of patients, patients who come for inpatient treatment in suburban hospitals to inpatient treatment in hospitals in the city, so the ratio of inpatient to outpatient is much lower than that of hospitals far from the city, patients come for inpatient treatment more consistently.

However, this study did not take into account the ratio of hospitalizations to the population as well as the number of beds (AB hospital has 180 beds compared to TO hospital has only 50 beds).

Conclusions

1) The overall disease structure according to 22 disease chapters in both hospitals is quite stable. and the impact of the pandemic has not been shown. The three disease chapters that always account for the highest rate are chapter IV; chapter X and chapter XIX. TO hospitals in the suburbs of large cities also account for 2 more chapters IX and XI.

2) The fluctuation of disease structure in the two inpatient and outpatient areas in the context of the Covid-19 epidemic: the number of outpatients when the epidemic occurred tended to increase. on the contrary. the number of inpatients decreased quite significantly. For AB hospital far from the city, in which in 2020 it decreased compared to previous years. The clinic area increased sharply, while the inpatient area decreased deeply, especially the diseases in the Top 10. The sharpest decrease is the musculoskeletal - joint braids. There are 3 diseases that have decreased a lot: such as gastroduodenitis (K29) decreased by more than 10 times, from 6269 cases to 607 cases; asthma (J45) and atopic dermatitis (L20) also decreased by more than half. At TO hospital, the number of inpatients per year is very small. So the impact of the epidemic has not been seen.

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