ORIGINAL ARTICLES

Status of outpatient treatment management of patients with type 2 diabetes at Buon Ma Thuot city general hospital, 2024

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ABSTRACT

Objectives: Type 2 diabetes is among the most prevalent non-communicable, chronic diseases associated with endocrine disorders. Effective management and treatment of type 2 diabetes patients are crucial for glycemic control. This study aimed to analyze the current status of treatment management of type 2 diabetes at Buon Ma Thuot City General Hospital in 2024.

Methods: A mixed-method study, combining cross-sectional quantitative and qualitative components, was conducted from February 2024 to October 2024. The quantitative sample included medical records of 368 type 2 diabetes patients managed and treated from March 1, 2023, to March 31, 2024. The qualitative sample comprised four in-depth interviews with relevant stakeholders and one focus group discussion with outpatient type 2 diabetes patients.

Results: The prevalence of type 2 diabetes in 2024 was 17.2%. One hundred percent of patients diagnosed with type 2 diabetes had their electronic medical records established and managed, received treatment plans and protocols, and were provided with outpatient treatment adherence monitoring logs. They also received reminders on follow-up appointments with access to health counseling and education information provided by the hospital via videos at the registration counter and direct advice from doctors and nurses.

Conclusion: Outpatient treatment management of type 2 diabetes at Buon Ma Thuot General Hospital have considerably good performance. However, the hospital should ensure the availability of diabetes drug and improve the infrastructure for diabetes testing and communication to support consultation and education on diabetes and other non-communicable diseases.

Keywords: *Type 2 diabetes, outpatient management, non-communicable, chronic diseases.*

INTRODUCTION

The World Health Organization (WHO) has stated: "The 21st century is the century of endocrine diseases and metabolic disorders, typically diabetes mellitus (DM)". Among the types of diabetes, type 2 diabetes accounts for 90-95% (1). According to the International Diabetes Federation in 2021, it is estimated that there are 537 million people with diabetes worldwide, accounting for 10.5% of the global adult population (20-79 years old). This number is expected to increase to 643 million in 2030 and 783 million in 2045 (2).

In Vietnam, the rapid growth of diabetes has become a major problem for the health sector in recent years. The Ministry of Health (MOH) issued Decision No. 3798/QD-BYT and Decision No. 5481/QD-BYT in 2020 guiding the diagnosis and treatment of type 2 diabetes. Outpatient treatment management of diabetic patients included: 1) screening and diagnosis, 2) treatment and periodic

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re-examination, 3) monitoring and supervising treatment compliance, and 4) counseling and education activities. In which, the coordination of all activities plays a key role in achieving effective management. Diabetes management results used indicators such as blood glucose, HbA1C, and the proportion of people with diabetes under management in the community. The results of the STEPwise approach to non-communicable disease risk factor surveillance conducted by MOH in 2020 showed that there were nearly 5 million people with diabetes nationwide, equivalent to 7.1%, of which only about 35% were diagnosed and 23.3% were managed and treated at medical facilities (3). This shows that there are many factors affecting the management and treatment of diabetes at medical facilities, leading to limited results in some aspects of treatment management.

Buon Ma Thuot City General Hospital is a grade II hospital under the Dak Lak Department of Health. Since 2017, the hospital has provided outpatient services for type 2 diabetes patients. As of March 2024, the number of patients over 18 years old under outpatient management at the hospital increased to 4,480, emphasizing the need to strengthen treatment management to keep diabetes under control in the community. Therefore, we conducted this study to analyze the current management of type 2 diabetes patients at Buon Ma Thuot General Hospital in 2024, thereby recommending solutions to improve the effectiveness of type 2 diabetes treatment management at the hospital.

METHODS

Study design: A mixed-method study, combining cross-sectional quantitative and qualitative components.

Study site and time: The study was conducted from February 2024 to October 2024 in Examination Department - Buon Ma Thuot City General Hospital.

Study subjects:

Quantitative research: We reviewed electronic medical records (EMR) of patients aged 18 and over diagnosed with type 2 diabetes stored on the outpatient management software at Buon Ma Thuot General Hospital from March 1, 2023, to March 31, 2024. In addition, documents, records, books, and reports related to the management of diabetes patients at the hospital from March 1, 2023, to the end of March 2024 which were approved by hospital authorities also were collected to extract data.

Qualitative research: Hospital leaders, leaders of the Examination Department, doctors directly treating outpatients with type 2 diabetes, nurses directly managing, monitoring, and updating information on the type 2 diabetes patient EMR, and type 2 diabetes patients were invited to join this study.

Sample size and sampling methods

Quantitative research: In this paper, we applied the formula to specify the anticipated proportion of patients with type 2 diabetes who complied with treatment management as follow:

$$n = Z^2_{(1-\alpha/2)} \frac{p(1-p)}{d^2}$$

The sample size for the number of EMR of type 2 diabetes patients (n) with $\alpha = 0{,}05$; $z_{1-\alpha/2} = 1{,}96$; $d = 0{,}05$; $p = 0.32$ (The rate of type 2 diabetes patients with good treatment results and timely follow-up visits was 31.9% in the study of Vu Minh Hieu (4)). The expected sample size was 334 with 10% reservation for ineligible EMR, the final sample size was 368 EMRs.

We applied a systematic random sampling method. 4480 EMRs of type 2 diabetes patients meeting the selection criteria were put in an ascending order of EMR number. With a selection interval $k = N/n = 4480/368 = 12.2$ (rounded to 12), the first EMR was randomly selected by drawing a number between 1 and 12. The next EMRs were selected if it had the serial number of the previously selected file

plus 12. The selection process was repeated until 368 EMRs were selected.

Qualitative research: Subjects to in-depth interviews (IDIs) and focus group discussions (FGDs) were purposely selected, ensuring that information was collected from relevant stakeholders and was appropriate to the available resources. We conducted 04 IDIs with healthcare workers (01 Deputy Director of the Hospital; 01 Head of the Examination Department; 01 Doctor directly treating outpatients with type 2 diabetes and 01 Nurse directly managing, monitoring, and updating information on the type 2 diabetes patient EMRs) and 02 FGDs with patients whose EMRs were selected for the quantitative study (01 FGD with a group of 08 type 2 diabetes patients who complied with regular re-examination within the past 1 year and 01 FGD with a group of 08 type 2 diabetes patients who did not comply with regular re-examination within the past 1 year).

Tools and methods of data collection

Quantitative research: Quantitative data were collected via 2 tools: (1) Pre-designed form to collect information and data extracted from the patient's electronic health insurance card such as age, gender, occupation, place of residence, use of health insurance, treatment regimen; number of scheduled visits, number of complications/incidents during treatment/ transfer; (2) Checklist to summarize data from reports, records, and books of the hospital related to the current status of type 2 diabetes outpatient management.

Qualitative research: The IDI and FGD guidelines were designed specifically to collect additional information, explain the reasons for non-compliance, and clarify the status of type 2 diabetes outpatient management at Buon Ma Thuot City General Hospital and factors associated with the current management of type 2 diabetes.

Processing and analyzing data

Quantitative research: Epidata 3.0 was used to enter data collected from the patients' EMRs. Descriptive statistics was performed using SPSS 20.0. Data collected from checklists were entered and processed using Microsoft Excel to calculate the quantity and percentage related to the status of type 2 diabetes outpatient management in the hospital.

Qualitative research: The audio recordings of the IDIs and FGDs were transcribed and saved in text format (Microsoft Word) and analyzed by topic, commenting and evaluating the current situation and level/trend (favorable, difficult) in the management and outpatient treatment of type 2 diabetes in the hospital.

Research ethics: The study fully complied with ethical regulations in research. The research protocol was approved by the BRI Council of the University of Public Health in document No. 232/2024/YTCC-HD3 dated May 23, 2024.

RESULT

Characteristics of study participants

Among 368 EMRs of type 2 diabetes patients, 58.2% were female; 57.9% were over 60 years old; 47.8% were elderly, retired or homemakers. Most patients (99.7%) used health insurance to cover the cost of examination and treatment services. 35.1% of patients lived more than 10 km from the hospital. The average number of years diagnosed with type 2 diabetes in the study was 6.6 years.

Compliance with treatment management

Screening and diagnosis

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Table 1. Diabetes screening and diagnosis activities in the hospital

Information		From 01/3/2023 to 31/3/2024
Diagnosis of type 2 diabetes	Number of people screened	26,003
	Number of people diagnosed with type 2 diabetes	4,480
	Percentage of people with type 2 diabetes	17.2%
Outpatient management of type 2 diabetes	Number of people with type 2 diabetes managed and treated as outpatients at the hospital	4,480
	Percentage of patients whose EMRs were managed	100%
	Percentage of outpatient treatment monitoring record	100%

Table 1 shows that 26,003 people were screened for diabetes in the past year (from March 1, 2023, to March 31, 2024), of which 17.2% were diagnosed with type 2 diabetes. All patients diagnosed with type 2 diabetes were managed as outpatients at the hospital, of which 100% had their EMR established and 100% had an outpatient treatment monitoring record.

In order to achieve such high coverage of screening and diagnosis activities, the hospital developed an annual diabetes management plan and provided monthly reports in accordance with regulations, all activities were closely monitored every quarter. The current examination process at the clinic was convenient for both doctors and patients.

"Diabetes management is implemented smoothly thanks to the support and attention of hospital leaders. The implementation process is convenient for doctors and patients according to the guidelines of the Ministry of Health." - IDI leader 2.

In addition, the hospital used EMR management software to manage type 2 diabetes from the initial assessment to the record keeping stages. All patient information was recorded on the software, except for health education and counseling activities. The application of information technology had a positive impact on patient management, making it easy to retrieve patient information and enabling data sharing with other hospitals.

"The IT software has many features such as drug warnings, drug interactions, HbA1c test warnings prescribed every 3 months, appointment for follow-up visits, medical examination history lookup, drugs and technical services performed... ensuring convenience and accuracy in diabetes management and treatment." – IDI doctor.

Treatment and periodic re-examination

Table 2. Treatment plan and regimen (n= 368)

Information		N	%
The number with established treatment plan		368	100
Distribution by treatment regime	Treatment with 1 type of medicine	12	3.2
	Treatment with 2 to more types of medicine	267	72.6
	Combination of oral medication and subcutaneous insulin injections	89	24.2
Patients with correct regime	Correct regimen	368	100
	Incorrect regimen	0	0

Table 2 shows that 100% of patients had a treatment plan with correct regimen. Of which, 72.6% received a treatment regimen of two or more drugs. 24.2% had to be treated with a combination of oral medication and subcutaneous insulin injection. 3.2% of patients had a treatment regimen with one drug.

Qualitative findings show that the availability of drugs for type 2 diabetes treatment was limited because two among twelve drug groups stipulated by Decision 5481/QD-BYT were not included in the hospitals' procurement list since they were contraindicated for people over 60 years old, the majority of the hospital's type 2 diabetes patients. In addition, the hospital was unable to purchase other three drug groups due to bidding difficulties. This situation negatively affects the management of diabetes patients in the hospital.

"... Drug management still faces many difficulties, the drug list is incomplete due to the purchasing, bidding, and supply mechanisms of contractors. ..." – IDI leader 1.

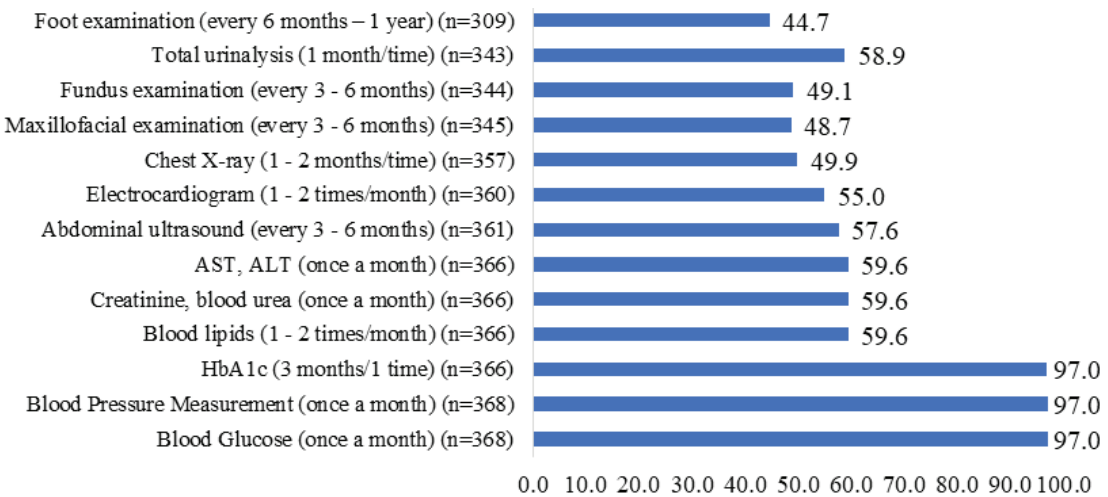

Figure 1. Compliance with pperiodic examination indexes in the past year (n=368)

Figure 1 shows that among thirteen periodic examination indexes in the treatment regimen of 368 EMR, 02 indexes, which were prescribed for all patients once a month, were blood pressure and blood glucose measurements. Highest compliance was observed in blood pressure, monthly blood glucose and 3-month HbA1c index (97%), followed by blood lipid indexes (once every 1-2 months), Creatinine, blood urea, AST, ALT once a month (59.6%), and the lowest was foot examination (44.7%).

Observation of the actual facilities for the outpatient examination and treatment of diabetes patients showed that the hospital had adequate infrastructure for diabetes testing, including ten internal medicine examination tables, three ultrasound rooms, two blood collection rooms, one X-ray room, one CT room, one ECG room, and two drug dispensing doors at the Pharmacy Department. However, in-depth interviews with medical staff and patients reveal that the current infrastructure at the hospital was cramped, old equipment and machinery was often out of service and was not adequate to serve the number of patients. Patients had to wait quite a long time for the tests because of the overloaded number of patients or broken machines..

"Many of the equipment and machines are often broken, so waiting for tests takes a long time...." – FGD 02.

Monitoring and supervising treatment compliance

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Table 3. Monitoring complications, referrals, re-examinations, and monitoring of treatment compliance in the past year (n= 368)

Information		N	%
Complication	No complication	339	92.1
	1 complication	12	3.3
	2 complications	15	4.1
	3 complications	2	0.5
Referral	No referral	341	92.6
	1 referral	22	6.0
	From 2 and more referrals	5	1.4
Monitoring of treatment compliance	Medical staff scheduled a follow-up appointment	368	100
	Medical staff monitored and supervised drug use.	368	100
	Prescriptions were managed on software, on EMR	368	100
	Medical staff noted and advised patients to monitor their health status during outpatient treatment.	368	100
	Patients used up all their medication and came to pick it up on time.	357	97.0
	Patients had regular check-ups according to the scheduled appointment	357	97.0

Table 4 shows that 100% of patients' EMRs had records of follow-up visits scheduled by medical staff, notes on medication use, information on prescriptions at each visit, and notes and instructions on health status monitoring during outpatient treatment by medical staff in the past year. About 97% of patients used up all their medication and came to get it on time and had regular follow-up visits followed the appointment schedule. 92.1% of patients had no complications. Only 7.4% of patients had to be transferred to a higher level in the past year.

From the patients' perspectives, the reasons why they did not comply with the re-examination and medication schedule were lacking awareness, forgetting the appointment, or living far away.

"However, some people who are take the disease lightly, still think that treatment will completely cure the disease, so as soon as blood sugar returns to normal, they stop taking medication and do not return for a check-up, causing the disease to become more severe, causing many complications that make treatment difficult (IDI doctor).

"Many of us cannot fully follow the doctor's instructions because we are old and forgetful, sometimes forgetting to take medication or not taking it on time" (FGD 2) "I am old and weak, I cannot go by myself, my children take me to the doctor, but on the day of the examination, they are busy with work and cannot take me (to the hospital)" (FGD 2).

Consulting and education activities

The hospital provided health education and counseling activities for type 2 diabetes patients with contents focusing on diet, medication regimen, exercise regimen, home blood glucose testing, re-examination, periodic health check-ups, prevention, and detection of complications. The hospital created 03 videos/clips to be broadcasted twice a day on the TV screen located in the hallway of the hospital's Examination Department. In addition, health education and counseling contents about diabetes were provided directly by medical staff during examination.

Qualitative results show that the hospital lacked medical staff specializing in diabetes consultation as well as no separate consultation room. The hospital resolved this issue by having doctors

provided consultation and guidance to patients during diabetes examinations.

"All patients who come for examination received consultation, because the hospital does not have a separate diabetes consultation room, so the doctor consults the patient during the examination." – IDI doctor.

According to IDI with the hospital leader, it was difficult to organize such communication activities for patients as training for patients' knowledge improvement, talks on prevention and treatment compliance at home because of inadequate funding. In the past year, the cost of diabetes management activities accounted for about 10% of the hospital's total cost of professional activities which was mainly paid by health insurance. In addition to health insurance, diabetes management had no other financial source.

"Health education and communication programs to improve patients' knowledge cannot be organized due to lack of funding." – IDI leader 2.

DISCUSSION

The rate of people diagnosed with type 2 diabetes in 2024 at Buon Ma Thuot General Hospital was 17.2%. This rate was higher than that of the study by Tran Quang Quy in Soc Trang in 2020-2021 (11.75%) (5). Buon Ma Thuot General Hospital should maintain this performance and take steps to improve the quantity and quality of diabetes services to serve the growing population of potential clients in the future.

In this study, 100% of people after being diagnosed with type 2 diabetes had their medical information recorded and managed on the software. All patients were closely monitored to ensure compliance with treatment, received reminders of regular check-up schedule, and had access to health education and counseling information. The results were similar to the study by Nguyen Ngoc Thao and colleagues at Tien Giang Central General Hospital in 2020 (6) and consistent with the trend shown in the study by Le Xuan Duc and colleagues at Binh Duong Private General Hospital in the period 2021-5/2023 (74.3% - 98%) (7). Our study findings were similar to Vu Minh Hieu's study on communication and consultation activities which reported that 100% of patients received direct consultation from treating physicians, with diverse forms of communication (4). Our findings suggest that the application of intelligent technology (IT) might contribute to the positive results in the hospital performance on diabetes management.

About 72.6% of patients were treated with a treatment regimen of two or more drugs. This result was equivalent to the rate of 70.5% of patients treated with a multi-drug regimen in the study by Nguyen Ngoc Thao and colleagues (6), and 75.1% of patients used two or more drugs in Vu Minh Hieu's study (4). The rate of patients requiring insulin injections in our study was 24.2% which was equivalent to Vu Minh Hieu's study (24.9%) (4) but much lower than 54.6% in Nguyen Ngoc Thao's study (6). This status could be improved when Buon Ma Thuot General hospital has more control of drug availability by improving their procurement and bidding process.

Our study examined thirteen periodic examination indexes. These indexes were similar to the study of author Vu Minh Hieu (4) and Le Xuan Duc (7). The highest compliance rate of type 2 examination index was for blood pressure, monthly blood glucose measurements and 3-month HbA1c test (97%). These rates in Le Xuan Duc's study only reached 85.5% to 91.9% (7). The rate of "foot examination" in our study was the lowest among the thirteen indexes with 44.7%. In Le Xuan Duc's study, this index also had the lowest rate (4.4%) (7). Our study showed that the rate of patients who had complications was 7.9% and 7.4% of patients had to be transferred to a higher level within the past year. This rate was lower than that of the study by Vu Minh Hieu (hypertensive complications were 54% and cardiovascular complications were 35.6%) (4) and the study of Tran Thi Muoi (76,9%) (8). It is difficult to find reasons for inconsistency among studies' findings on diabetes complications because these conditions depend on several factors

such as detection and treatment at early stage of the disease, strict compliance to treatment and healthy lifestyles. Future studies should consider the combination of available secondary data sources and quantitative patients' interviews for better understanding of the status of diabetes conditions and its underlying factors.

About 97% of patients came to get medicine and had timely regular check-ups following their appointment schedule. This rate was higher than that of Le Xuan Duc's study in 2023 in Binh Duong (over 80%) (7) but similar to Tran Thi Muoi's study in Tien Giang (95.8%) (8). Despite the differences, studies have shown that the rate of patients coming to get medicine and have regular check-ups according to the medical facility's appointment schedule is quite high and has increased gradually in recent years. This proves that patients have gained more trust in outpatient management of type 2 diabetes and have improved their compliance with treatment management.

Limitation: First, quality of secondary data depends on the accuracy and reliability of the EMRs, reports, and books. Therefore, the description of the status of outpatient management and treatment of type 2 diabetes may not be complete. Second, qualitative data via IDI and FGD may be subjective because of participants' bias. Third, the study did not investigate and evaluate patient compliance with the treatment regimen. Lastly, findings at Buon Ma Thuot City General Hospital may only be representative of other hospitals with the same characteristics. Precautions are necessary when generalizing results for other health facilities.

CONCLUSION

Outpatient treatment management of type 2 diabetes at Buon Ma Thuot General Hospital have satisfactory performance in accordance with the guidelines of the Ministry of Health. The hospital needs to develop a repair and procurement plan in consultation with experts and relevant agencies to promptly overcome difficulties in purchasing and bidding for drugs and medical supplies. In addition, the hospital should consider arranging separate rooms for consultation and health education on diabetes and other non-communicable chronic diseases.

REFERENCES

1. The American Diabetes Association. Classification and diagnosis of diabetes: standards of medical care in diabetes - 2019. Diabetes care. 2019. 42(Supplement 1): S13-S28, https://doi.org/10.2337/dc19-S002.
2. Dianna J.M., Edward J.B. IDF Diabetes Atlas 10th edition scientific committee. Brussels: International Diabetes Federation. 2021.
3. Bộ Y tế. Khoảng 5 triệu người Việt đang mắc căn bệnh gây nhiều biến chứng về tim mạch, thần kinh, cắt cụt chi. 2022. Available at: https://moh.gov.vn/hoat-dong-cua-lanh-dao-bo/-/asset_publisher/TW6LTp1ZtwaN/content/khoang-5-trieu-nguoi-viet-ang-mac-can-benh-gay-nhieu-bien-chung-ve-tim-mach-than-kinh-cat-cut-chi-
4. Vũ Minh Hiếu. Thực trạng hoạt động quản lý người bệnh đái tháo đường tuýp 2 điều trị ngoại trú tại khoa Nội Tiết, bệnh viện quận Thủ Đức, thành phố Hồ Chí Minh, năm 2018-2019. Trường Đại học Y tế công cộng. Hà Nội: 2020.
5. Trần Quang Quí, Lê Minh Lý. Nghiên cứu tình hình đái tháo đường type 2 ở người trên 40 tuổi và đánh giá kết quả truyền thông tại huyện Thạnh Trị, tỉnh Sóc Trăng năm 2020- 2021. *Tạp chí Y dược học Cần Thơ*. 2021;40:42-47.
6. Nguyễn Ngọc Thảo, Châu Mỹ Chi, Phạm Quỳnh Anh. Đánh giá kết quả quản lý điều trị ngoại trú người bệnh đái tháo đường típ 2 tại phòng khám nội tiết, Bệnh viện Đa khoa Trung tâm Tiền Giang năm 2020. *Tạp chí Khoa học Nghiên cứu Sức khỏe và Phát triển*. 2022;6(01):123-132.
7. Lê Xuân Đức, Nguyễn Đức Hòa, Nguyễn Ngọc Lý và cộng sự. Quản lý điều trị ngoại trú người bệnh đái tháo đường type 2 và một số yếu tố ảnh hưởng tại Bệnh viện đa khoa tư nhân Bình Dương giai đoạn 2021-5/2023. *Tạp chí Y học Việt Nam*. 2023;530(1B):54-59.
8. Trần Thị Mười, Tạ Văn Trầm. Thực trạng quản lý người bệnh đái tháo đường típ 2 điều trị ngoại trú tại Bệnh viện đa khoa tỉnh Tiền Giang. *Tạp chí Y học Việt Nam*. 2022;525(1B):112-116.
9. Nguyễn Văn Hiển. Thực trạng quản lý người bệnh đái tháo đường típ 2 điều trị ngoại trú tại bệnh viện Quân y 109 và các yếu tố ảnh hưởng năm 2022. Đại học Y Dược Cần Thơ. 2022
10. Trần Văn Nhứt. Thực trạng và giải pháp quản lý bệnh đái tháo đường type 2 cho cán bộ thuộc diện Ban bảo vệ chăm sóc sức khỏe tỉnh Đồng Tháp năm 2016. Trường Đại học Y tế công cộng. Hà Nội: 2018.