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ANALYSIS OF NUTRITIONAL STATUS IN PATIENTS WITH CIRRHOSIS AT HANOI MEDICAL UNIVERSITY HOSPITAL

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Abstract

Background: Nutrition helps the damaged liver to function properly, reduces the risk of infection and ascites, provides daily energy and helps prolong the life of people with cirrhosis. **Objective:** To assess the nutritional status in patients with cirrhosis at Hanoi Medical University Hospital (HMUH) in 2022. **Study design:** Cross-sectional description. **Results:** A total of 109 patients participated with the male/female ratio of 6.2/1; and the mean age of 54.1 ± 10.8 . Malnutrition of cirrhotic patients according to BMI, Subjective Global Assessment (SGA), Albumin (Alb) was 2.7%, 43.1%, 67%, respectively. **Conclusions:** Because of the severe effects of malnutrition on cirrhotic patients, assessment of nutritional status is very important and necessary.

Keywords: Nutritional status, cirrhosis, malnutrition.

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I. INTRODUCTION

Cirrhosis is being the 15th leading cause of morbidity¹ and 14th most common cause of death worldwide². Global liver cirrhosis deaths increased from around 676,000 in 1980 to over 1 million in 2010 (about 2% of the global total)³, accounting for 2.2% of deaths years worldwide in 2016 and caused 1.32 million deaths in 2017¹. Cirrhosis caused 31 million of Disability Adjusted Life Years (DALYs), accounting for 1.6%, and made up 2.1% of the worldwide burden⁴. According to the World Health Organization (WHO), Vietnam has a cirrhosis rate of 5% of the population, in which viral cirrhosis accounts for 40% and alcoholic cirrhosis accounts for 18%. The number of deaths accounts for 3% of all cases caused by diseases⁵. The estimated number of people with decompensated cirrhosis due to hepatitis B was 90704 in 2017 and is expected to increase by 10% by 2030⁶.

Nutrition is very important with cirrhosis because it helps the damaged liver to function properly, reduces the risk of infection and ascites, provides daily energy and helps prolong the life of people with cirrhosis⁷. Malnutrition is a burden in patients with cirrhosis, it is associated with the progression of liver failure and complications including infection, hepatic encephalopathy, and ascites⁸. Complications requiring hospitalization and mortality were higher in malnourished cirrhotic patients than in well-nourished cirrhotic patients⁹.

With the increasing number of cases of cirrhosis in Vietnam, assessment of nutritional status is necessary for timely and reasonable nutritional intervention, thereby increasing the number of recoveries and reducing mortality. So, we conducted this study with objective:

To assess the nutritional status in patients with cirrhosis at Hanoi Medical University Hospital (HMHU) in 2022.

II. RESEARCH SUBJECTS AND METHODS

2.1. Place and time of study

- Location: Department of General Internal Medicine, HMUH.
- Duration: From January to September 2022.

2.2. Research subjects

- Inclusion criteria:

- + Diagnosed with cirrhosis of any etiology (alcoholism, hepatitis C, cryptogenic/ Non-alcoholic fatty liver disease, autoimmune).
- + Newly admitted to HMUH.
- + Adults (≥ 18 years old).
- + Agreed to participate in this study.

- Exclusion criteria:

- + Patients with Hepatic Encephalopathy, active gastrointestinal bleeding, acute liver failure, hepatocellular carcinoma.
- + Patients with other co-morbid conditions requiring dietary modification and restrictions.
- + Patients with scoliosis, neuromuscular disorders in the upper limbs, or lack of upper limbs.
- + Mute, deaf, neurological disorders, or other medical conditions that would prevent understanding for food records and answers' provision or anthropometric measurements.

2.3. Research Methods

2.3.1. Research design

Cross-sectional descriptive study

2.3.2. Sample size

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

n: quantity to be investigated

Z: 95% confidence level, Z=1.96

P=0.6 (proportion of malnourished cirrhotic patients according to SGA at HMUH in 2020)¹⁰

d=0.1 is the difference between sample and population

2.3.3. Sampling method

Convenient sampling method

2.4. Research variables and indicators

- General information of subjects
- Patient's nutritional status: BMI, SGA, biochemical tests.
- Child-Pugh-Turcotte classification (CPT): A, B or C

2.5. Data analysis

version 15.0 will be used for data analysis.

REDCap was used to enter all variables. Stata

III. RESULTS**3.1. General characteristics of the subjects***Table 3.1 Demographic characteristic of the participants (n=109)*

General information		n	%
Age Mean \pm SD 54.1 \pm 10.8	18 -30 years	1	0.9
	31-40 years	9	8.3
	41-50 years	21	19.3
	51-65 years	58	53.2
	>65 years	20	18.3
Gender	Male	94	86.2
	Female	15	13.8
Ethnic	Kinh	100	91.7
	Other	9	8.3
Residence	Rural	70	64.2
	Urban	39	35.8
Occupation status	Officials	4	3.7
	Farmers	16	14.7
	Worker	5	4.6
	Retirement	11	10.1
	Freelance	47	43.1
	Other	26	23.8
Level of education	Primary school	8	7.3
	Junior high school	34	31.2
	High school	47	43.1
	Intermediate College	13	11.9
	University /Postgraduate Degree	7	6.4

The proportion of male and female were 86.2% and 13.8%, respectively. The mean age of the subjects was 54.1 \pm 10.8. The 51-65 year old group accounted for the majority (53.2%). Regarding the current residence, 35.8% of

subjects are living in city and 64.2% living in countryside. Most of the subjects have high school level (43.1%). The majority of subjects were freelance (43.1%), the lowest rate for officials (3.7%).

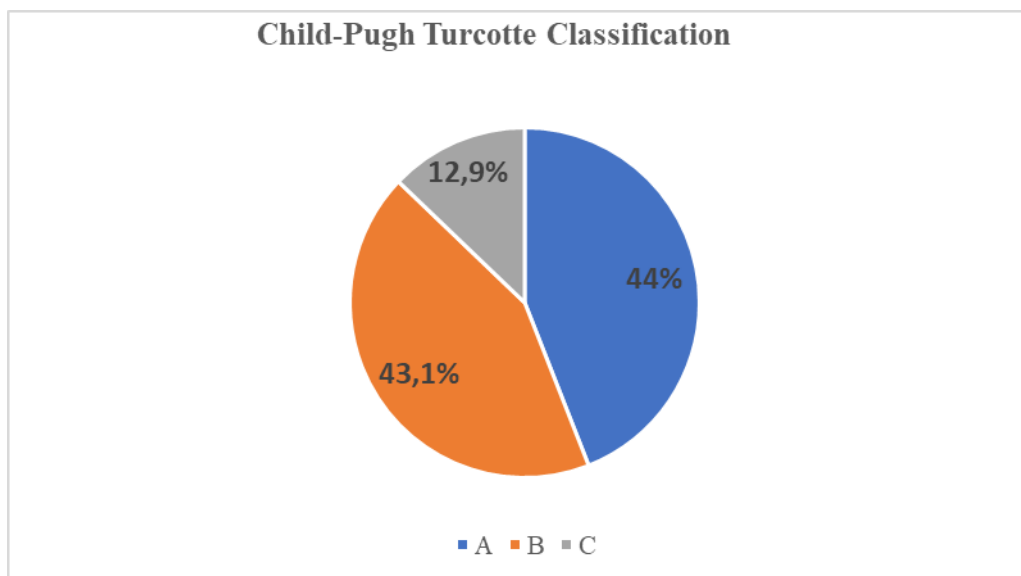


Chart 3.1. Child-Pugh Turcotte Classification of participants (n = 109)

Our study showed that 44% of patients were classified as A, 43.1% as B, and 12.9% as C.

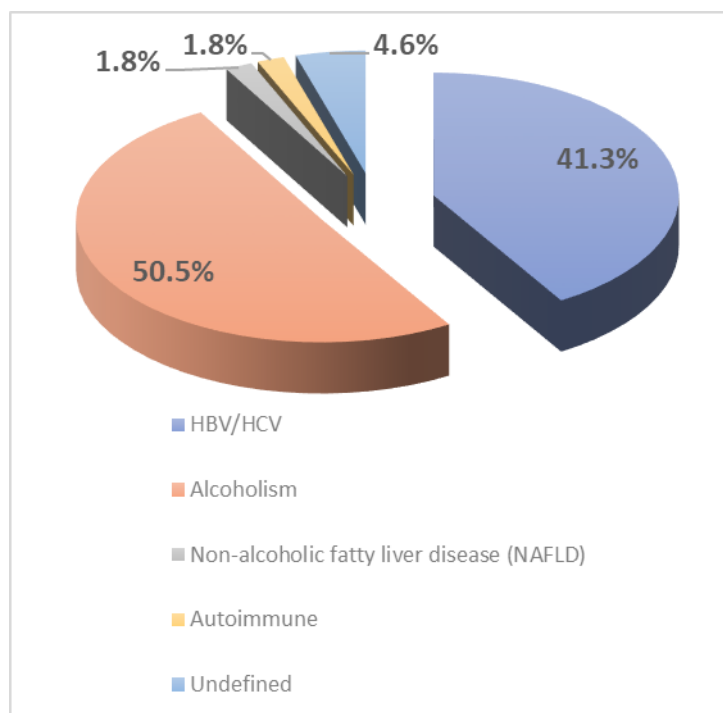


Chart 3.2. Etiology of cirrhosis (n=109)

Alcoholism had the highest amount of cases (50.5%). The second-highest cause was the hepatitis virus (HBV/HCV) (41.3%). Both NAFLD and auto-immune only had 2 case (1.8%). The remaining 5 patients (4.6%) have not identified the etiology of cirrhosis

Table 3.23. Biochemical measurements of the study subjects

Indicators	(Mean \pm SD) (Min-Max)	Reference range	n (%)		
			Normal	Reduce	Increase
Albumin (g/L)	32.42 \pm 6.57 (16.5-52.2)	35-52	35 (32.1)	73 (67.0)	1 (0.9)
Total protein (g/L)	70.51 \pm 7.27 (47.5-86.4)	64-83	90 (82.6)	17 (15,6)	2 (1.8)
Total Bilirubin (μ mol/L)	66.28 \pm 94.02 (6.5-601.1)	5-21	33 (30.3)	0	76 (69,7)
Glucose (mmol/L)	7.15 \pm 3.25 (3.9-24.3)	4.11-5.89	41 (37.6)	2 (1.8)	66 (60,6)
Hemoglobin (g/L)	120.93 \pm 31.27 (49-363)	125-175	44 (40.4)	64 (58.7)	1 (0.9)

Biochemical indexes were all elevated such as: serum Albumin concentration (0.9%), Total protein (1.8%), Total Bilirubin (69.7%), Glucose (60.6%), Hemoglobin (0.9%). The test indexes that decreased the most were Albumin (67%), followed by Hemoglobin (58.7%), not only that, their average values were all in the low range, respectively 32.42 \pm 6.57 g/L and 120.93 \pm 31.27 g/L. The average value of the test indicators in the high threshold study subjects was Total Bilirubin (66.28 \pm 94.02 μ mol/L) and Glucose (7.15 \pm 3.25 mmol/L), respectively. Only the mean value of Total protein (70.51 \pm 7.27 g/L) was within the normal range.

3.2. Nutritional status of patients with cirrhosis

Table 3.3. Classification of nutritional status of study subjects according to SGA

Classification of SGA	N	%
SGA-A	62	56.9
SGA-B	45	41.3
SGA-C	2	1.8
Total	109	100

The proportion of patients at risk of malnutrition was 43.1% (including subjects with SGA types B and C).

Table 3.4. Nutritional status of patients with cirrhosis

	Nutritional status			
	Normal (n,%)	Malnutrition		
		Mild (n,%)	Moderate (n,%)	Severe (n,%)
SGA	62 (56.9)	45 (41.3)		2 (1.8)

In 47 patients had malnutrition diagnosis, 45 patients (41.3%) had mild to moderate malnutrition and 2 patients (1.8%) had severe malnutrition.

IV. DISCUSSION

4.1. Characteristics of patients with cirrhosis

The study was conducted on 109 cirrhotic patients with an average age of 54.1 ± 10.8 . This result does not have significant difference with the results of Krishna C, et al on 2.017 cirrhotic patients and the average age was 52 ± 11 ¹¹.

Male patients were 6.3 times higher than female patients. This result is different from the results of Suzana and Marcellus¹² with the male/female ratio of 1.7/1. Even though, the percentage of male cirrhotic patients is higher than female.

The mean weight of male patients was 61.55 ± 7.25 kg; female was 54.67 ± 7.16 kg. The average height of men were 164.45 ± 6.94 cm; of women were 153.6 ± 10.64 cm. Comparing with the average weight and height of the Vietnamese person, there were no difference.

4.2. Etiology of cirrhosis and Child-Pugh classification

The main cause of cirrhosis is alcoholism (50.5%), followed by HBV/ HCV (41.3%). Alcohol is also the leading cause of cirrhosis in northern India with prevalence 62.9% according to a study by Sharma¹³.

4.3. Biochemical measurements

The results of the mean values of the laboratory parameters of the subjects were: Albumin (32.42 ± 6.57 , low), Protein Total (70.51 ± 7.27 , normal), Bilirubin Total (66.28 ± 94.02 , high), Glucose (7.15 ± 3.25 , high), Hemoglobin (120.93 ± 31.27 , low). The mean value of Albumin is not significantly different from the study of Mehmet et al¹⁴. Glucose index increased 60.6%, much higher than the study of Tsutomu Nishida¹⁵ gave 15-30% when talking about the rate of hyperglycemia of cirrhotic subjects. The most significant decrease in laboratory parameters was Albumin (67%), followed by Hemoglobin (58.7%) - this is different from the rate of decrease in hemoglobin in patients with cirrhosis up to 70% that Graziella Privitera and Giovanni Meli reported¹⁶.

4.4. Nutritional status in patients with cirrhosis at HMOU in 2022

4.4.1. According to SGA classification.

The study results showed that 56.9% of patients had well-nourished (grade A), 41.3% of patients had mild/moderate malnourished (grade B), 1.8% of patients have severe malnourished (grade C). The results of this study differ significantly in the distribution of SGA A, B, and C ratios with the results of TEIUSANU et al¹⁷ with well-nourished – SGA A 76%, mild/moderately malnourished – SGA B 15% and severely malnourished - SGA C 9%. This difference may be partly due to the subjective assessment as well as the different nutritional status of the patients each time. Compared with some other authors, we found that the SGA - A group accounted for the majority, the rate gradually decreased in the SGA - B and C groups. This difference may be caused by disease factors, Pain, taste changes, nausea lead to anorexia, so long-term weight monitoring (for 6 months) is likely to have deviations between methods of assessing nutritional status.

4.4.2. According to serum Albumin.

In the study, the percentage of patients with cirrhosis who were assessed as at risk of malnutrition classified based on serum Albumin index was 67%. Of the three assessment methods, the ALB method has the highest rate of malnutrition, accounting for 67%, then the SGA method (43.1%), the malnutrition rate according to BMI is quite low compared to the two methods mentioned above (only 2.7%).

V. CONCLUSION

Because of the severe effects of malnutrition on cirrhotic patients, the assessment of nutritional status is very important and necessary. However, it is equally important to choose an appropriate, low-cost, minimally invasive nutritional status assessment method that can be performed by both physicians and nurses. The SGA method of assessing nutritional status almost meets the above requirements. However, it cannot be denied the importance of assessing and monitoring nutritional status based on ALB for patients with cirrhosis.

REFERENCES

- Asrani SK, Devarbhavi H, Eaton J, Kamath PS. Burden of liver diseases in the world. *J Hepatol.* 2019;70(1):151-171. doi:10.1016/j.jhep.2018.09.014
- WHO | Methods and related documentation. WHO. Accessed October 3, 2018. http://www.who.int/healthinfo/global_burden_disease/data_sources_methods/en.
- DTN Huy. (2015). The critical analysis of limited south asian corporate governance standards after financial crisis, *International Journal for Quality Research* 9 (4)
- DTN Huy, TH Le, NT Hang, S Gwoździewicz, ND Trung, P Van Tuan. (2021). Further Researches and Discussion on Machine Learning Meanings-And Methods Of Classifying and Recognizing Users Gender on Internet, *Advances in Mechanics* 9 (3), 1190-1204
- DT Tinh, NT Thuy, DT Ngoc Huy. (2021). Doing Business Research and Teaching Methodology for Undergraduate, Postgraduate and Doctoral Students-Case in Various Markets Including Vietnam, *Elementary Education Online* 20 (1)
- DTN Huy, PN Van, NTT Ha. (2021). Education and computer skill enhancing for Vietnam laborers under industry 4.0 and evfta agreement, *Elementary Education Online* 20 (4)
- EASL Clinical Practice Guidelines on nutrition in chronic liver disease. *J Hepatol.* 2019;70(1):172-193. doi:10.1016/j.jhep.2018.06.024
- F Yong-Yan, J Manafian, SM Zia, DTN Huy, TH Le. (2021). Analytical Treatment of the Generalized Hirota-Satsuma-Ito Equation Arising in Shallow Water Wave, *Advances in Mathematical Physics* 2021
- H Van Thuc, DTT Thao, NN Thach, VT Dung, DTN Huy, NTP Thanh. (2020). Designing Data Transmission System with Infrared Rays, *Psychology and education* 58 (2), 3406-3411
- J Li, J Manafian, NT Hang, DTN Huy, A Davidyants. (2021). Interaction among a lump, periodic waves, and kink solutions to the KP-BBM equation, *International Journal of Nonlinear Sciences and Numerical Simulation*
- Khalil S, Youssef M, Mekkawy M, Abdelmalek M. Liver Cirrhosis: Assessment of Patients Nutritional Status at Assiut University Hospital. *Assiut Sci Nurs J.* 2015;3:114-125. doi:10.21608/asnj.2015.59806
- Koruk M, Onuk MD, Akçay F, Savas MC. Serum thrombopoietin levels in patients with chronic hepatitis and liver cirrhosis, and its relationship with circulating thrombocyte counts. *Hepatogastroenterology.* 2002;49(48):1645-1648.
- Ladep NG, Akbar SMF, Al Mahtab M. Global Epidemiology of Chronic Liver Disease. In: Wong RJ, Gish RG, eds. *Clinical Epidemiology of Chronic Liver Diseases.* Springer International Publishing; 2019:41-55. doi:10.1007/978-3-319-94355-8_5
- Malnutrition in cirrhosis increases morbidity and mortality - Maharshi - 2015 - *Journal of Gastroenterology and Hepatology* - Wiley Online Library. Accessed July 13, 2022. <https://onlinelibrary.wiley.com/doi/10.1111/jgh.12999>
- Mokdad AA, Lopez AD, Shahrzad S, et al. Liver cirrhosis mortality in 187 countries between 1980 and 2010: a systematic analysis. *BMC Med.* 2014;12:145. doi:10.1186/s12916-014-0145-y
- Linh NT, Chinh PTT, Tam NTM, My HH, Nam NT, Nga TT. Nutritional status and some related factors of cirrhosis patients at Hanoi Medical University Hospital. *Journal of Medical Research.* 2021;146(10):91-103. doi:10.52852/tencyh.v146i10.341
- Nguyen Thi Diep Anh, Nguyen Trong Hung, Tran Thi Tra Phuong, Le Thi Hang, Dinh Tran Ngoc Huy, Vu Thi Thu Hien, Bui Thi Thuy, Ngo Thi Thu Huyen, Le Thi Tuyet Nhung, Nguyen Thi Luong Hanh, Tu Thi Mai, Truong Tuyet Mai, Nguyen Hong Truong and Le Danh Tuyen. (2021). Determining the Glycemic Index

- of Nutritional Product for Diabetes Mellitus- Np through Measuring Glycemic Responses to Reference Food (Glucose) and Test Food (Nutritional product -Np), *Journal of Pharmaceutical Research International*, 33(47B)
- Nguyen V. (2018). *Estimates and Projection of Disease Burden and Economic Analysis for Hepatitis B in Viet Nam*
- N Thi Hang, D Thi Tinh, DT Ngoc Huy, PT Hong Nhung. (2021). Educating and training labor force
- Under Covid 19; Impacts to Meet Market Demand in Vietnam during Globalization and Integration Era,
Journal for Educators, Teachers and Trainers, 12(1)
- Ndraha S, Simadibrata M. Child Pugh and Male Gender were Related to Nutritional Status of Liver Cirrhosis Patients in Koja Hospital. :3.
- NT Hoa, DTN Huy, T Van Trung. (2021). Implementation of students's scientific research policy at universal education institutions in Vietnam in today situation and solutions, *Review of International Geographical Education Online* 11 (10), 73-80
- N ThiHoa, NT Hang, NT Giang, DTN Huy. (2021). Human resource for schools of politics and for international relation during globalization and EVFTA, *Elementary education Online* 20 (4)
- Nguyen Thi Minh Chinh, Pham Thi Bich Ngoc, Nguyen Minh Loi, Dinh Thi Thu Hang, Dinh Tran Ngoc Huy, Pham Van Tung. (2021). Deepening Analysis on Preventing Fall Risk with Knowledge and Practices of Nurses and Nursing, *Sys Rev Pharm*,12(3):308-313
- Nishida T. Diagnosis and Clinical Implications of Diabetes in Liver Cirrhosis: A Focus on the Oral Glucose Tolerance Test. *J Endocr Soc.* 2017;1(7):886-896. doi:10.1210/js.2017-00183
- N Van Dat, DTA Nhi, DTN Huy. (2021). Improving Tourism Entrepreneur's Competition during the COVID 19 Pandemic–A Case Study in Tourism Industry in Vietnam, *Revista Geintec-gestao Inovacao E Tecnologias* 11 (3), 112-126
- NTHIQ HUONG, BUIX NHAN, DTN HUY, NTHI TU. (2021). Factors Affecting The Decisions Of Local People To Participate In Community Tourism In The NorthWest of Vietnam, *Journal of Contemporary Issues in Business and Government*| Vol 27 (2)
- Pham Thi Bich Ngoc, Dinh Tran Ngoc Huy and Pham Thi Hong Nhung. (2021).Healthcare Policy for Patients with Chronic Heart Failures at Nam Dinh General Hospital in Vietnam,*Journal of Pharmaceutical Research International*, 33(40B)
- PN Tram, DT Ngoc Huy. (2021). Educational, Political and Socio-Economic Development of Vietnam Based on Ho Chi Minh's Ideology, *Elementary Education Online* 20 (1)
- Pham Thi Bich Ngoc, Dinh Tran Ngoc Huy, Vu Thanh Binh, Pham Thi Hong Nhung and Ngo Huy
- Hoang. (2021). Extra Analysis of Health Care Policy for Patients with Corona Virus during COVID 19 and with Chronic Heart Failures and Roles of Nurses at Hospitals in Vietnam, *Journal of Pharmaceutical Research International*, 33(47A)
- PM Dat, DTN Huy. (2021). Management Issues in Medical Industry in Vietnam, *Management* 25 (1), 141-154
- PTB Ngoc, NH Hoang, DTT Hang, DTN Huy, NTM Chinh, VT La. (2020). Evaluating fall prevention for patients at Nam Dinh Hospital in Vietnam, *European Journal of Molecular and Clinical Medicine* 7 (10), 3114-3119
- Privitera G, Meli G. An unusual cause of anemia in cirrhosis: spur cell anemia, a case report with review of literature. *Gastroenterol Hepatol Bed Bench.* 2016;9(4):335-339.
- Sharma B, Marwah R, Raina S, Sharma N, Kaushik M, Kaushal SS. A study on the

- etiology of cirrhosis of liver in adults living in the Hills of Himachal Pradesh, India. *Trop Gastroenterol Off J Dig Dis Found.* 2016;37(1):37-41. doi:10.7869/tg.317
- Sajja KC, Mohan DP, Rockey DC. Age and Ethnicity in Cirrhosis. *J Investig Med Off Publ Am Fed Clin Res.* 2014;62(7):920-926. doi:10.1097/JIM.000000000000106
- TEIUSANU A, ANDREI M, ARBANAS T, NICOLAIE T, DICULESCU M. Nutritional Status in Cirrhotic Patients. *Mædica.* 2012;7(4):284-289.
- TTB Hang, DTH Nhung, DTN Huy, NM Hung, MD Pham. (2020). Where Beta is going—case of Viet Nam hotel, airlines and tourism company groups after the low inflation period, Entrepreneurship and Sustainability Issues 7 (3)
- The Cinhosis Care Clinic at the University of Alberta located in Edmonton, Alberta, Canada. *The Nutrition In Cirrhosis Guide,* 2018.
- TTH Ha, NB Khoa, DTN Huy, VK Nhan, DH Nhung, PT Anh, PK Duy. (2019). Modern corporate governance standards and role of auditing-cases in some Western european countries after financial crisis, corporate scandals and manipulation, *International Journal of Entrepreneurship* 23 (1S)
- TH Le, DTN Huy, NT Le Thi Thanh Huong, SG Hang. (2021). Recognition of user activity with a combined image and accelerometer wearable sensor, *Design Engineering,* 6407-6421
- Vu Thanh Binh, Dinh Tran Ngoc Huy, Pham Thi Bich Ngoc, Pham Thi Hong Nhung, Dinh Tran Ngoc
- Hien and Ngo Huy Hoang. (2021).Effective Medicine Treatment for Corona Patients at Home in COVID 19 Pandemic - and Roles of Nurses and Doctors for Heart Failures Treatment, *Journal of Pharmaceutical Research International,* 33(47A)
- VQ Nam, DT Tinh, DTN Huy, TH Le, LTT Huong. (2021). Internet of Things (IoT), Artificial Intelligence (AI) Applications for Various Sectors in Emerging Markets-and Risk Management Information System (RMIS) Issues, *Design Engineering,* 609-618
- VT Binh, DTN Huy. (2021). Further Analysis on Solution Treatment for Diabetes of Patients at Hospitals in Vietnam, *NeuroQuantology* 19 (8), 88-93
- VT Binh, DTN Huy. (2021). Further Analysis on Characteristic of Diabetic Reinopathy-A Case in Thai Binh Province in Vietnam, *NeuroQuantology* 19 (6), 61-67