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EVALUATION OF THE EFFECTIVENESS OF THE LUC VI FORMULATION IN SUPPORTING MOTOR FUNCTION RECOVERY AND IMPROVING KIDNEY YIN DEFICIENCY WITHIN A COMBINED PROTOCOL OF MODIFIED ACUPUNCTURE, PHYSICAL THERAPY EXERCISES, AND THE BO DUONG HOAN NGU FORMULATION

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ABSTRACT
Objective: To evaluate the effectiveness of the Luc Vi formulation in supporting motor function recovery and improving Kidney Yin deficiency within a combined protocol of modified acupuncture, physical therapy, and the Bo Duong Hoan Ngu formulation in patients with post-stroke hemiplegia.
Methods: This was an open-label, randomized controlled clinical trial conducted on 152 patients with post-stroke hemiplegia for ≥ 3 months accompanied by Kidney Yin deficiency. Patients were divided into two groups: the control group received modified acupuncture, physical therapy, and the Bo Duong Hoan Ngu formulation; the study group received an additional Luc Vi formulation. Treatment effectiveness was evaluated using the Barthel Index, manual dexterity test, 10-m walking time, and the degree of improvement in Kidney Yin deficiency symptoms.
Results: After 40 days of treatment, both groups showed statistically significant improvements in motor function and Kidney Yin deficiency manifestations. The group supplemented with the Luc Vi formulation demonstrated faster and more pronounced improvements in several indicators compared with the control group.
Conclusion: The Luc Vi formulation plays an effective supportive role in motor function rehabilitation protocols and in improving Kidney Yin deficiency in patients with post-stroke hemiplegia.

KEYWORDS: cerebral stroke; hemiplegia; Liuwei Dihuang; rehabilitation; Kidney Yin deficiency.

1. INTRODUCTION

Cerebral stroke (cerebrovascular accident) is one of the leading causes of mortality and long-term disability worldwide as well as in Vietnam. The disease leaves many severe sequelae, among which hemiplegia is the most common consequence, seriously affecting mobility, daily activities, and patients' quality of life [1], [2], [10], [11], [22]. According to modern medicine, early and continuous rehabilitation plays a pivotal role in improving motor function, based on mechanisms of neuroplasticity and neural reorganization of the brain following ischemic injury [24], [27], [28].

In Vietnam, rehabilitation programs for patients with post-stroke hemiplegia have been implemented by the Ministry of Health from an early stage, emphasizing the role of systematic therapeutic exercises tailored to each stage of the disease [7], [8], [19]. However, in clinical practice, motor recovery outcomes still depend on many factors such as the extent of brain damage, time since stroke onset, treatment adherence, and accompanying systemic disorders [1], [17]. From the perspective of traditional medicine, post-stroke hemiplegia falls within the scope of the syndrome "Ban than bat toai" (hemiplegia), commonly caused by "Trung phong" (wind stroke), with pathogenesis related to deficiency of vital qi, particularly involving the Kidney organ system [3], [4], [20], [23]. Among these, Kidney Yin deficiency is commonly observed in patients during the post-stroke stage, manifested by prolonged fatigue, dry mouth, insomnia, red tongue with scanty coating, and thready rapid pulse, which impair the ability to recover motor function [13], [34]. Acupuncture and modified acupuncture techniques have been demonstrated in numerous domestic studies to be effective in motor rehabilitation after stroke, especially in the stage beyond three months [12], [14], [16], [21]. When combined with therapeutic exercise, rehabilitation efficacy is enhanced through simultaneous effects on the central nervous system and the musculoskeletal system, in accordance with the principles of modern rehabilitation medicine [8], [19], [29], [30].

In addition to non-pharmacological methods, the use of classical herbal formulas to regulate underlying pathological conditions according to traditional medicine has attracted increasing attention. The Liuwei Dihuang formula is a classic prescription for treating Kidney Yin deficiency, with effects of nourishing Kidney Yin, regulating Yin–Yang balance, improving general condition, and supporting functional recovery [6], [9], [15], [23]. Meanwhile, the Bo Duong Hoan Ngu formulation is commonly used in the treatment of post-wind stroke sequelae, with effects of tonifying qi, activating blood circulation, unblocking meridians, and supporting motor recovery [18], [20], [23].

Numerous domestic and international studies have demonstrated a trend toward integrating traditional medicine with modern medicine in post-stroke treatment and rehabilitation, based on evidence of neuroplasticity, cortical reorganization, and the effectiveness of multimodal and individualized treatment approaches [24], [25], [26], [27], [28], [32], [33]. However, in Vietnam, systematic studies evaluating the supportive role of the Luc Vi formulation within a combined protocol of modified acupuncture, therapeutic exercise, and the Bo Duong Hoan Ngu formulation in patients with post-stroke hemiplegia accompanied by Kidney Yin deficiency remain limited.

Based on the above theoretical foundations and clinical practice, this study was conducted to evaluate the effectiveness of the Luc Vi formulation in supporting motor recovery and improving Kidney Yin deficiency within a combined protocol of modified acupuncture, physical therapy exercises, and the Bo Duong Hoan Ngu formulation in patients with post-stroke hemiplegia for more than three months accompanied by Kidney Yin deficiency, thereby contributing scientific evidence for the integrated application of traditional medicine and modern medicine in post-stroke rehabilitation.

2. THEORETICAL BACKGROUND

2.1. Overview of Stroke and Hemiplegic Sequelae According to Modern Medicine

2.1.1. Concept and Clinical Characteristics of Stroke

Cerebrovascular accident refers to neurological deficits that occur suddenly, with focal rather than diffuse symptoms; the symptoms persist for more than 24 hours or result in death within 24 hours (excluding causes related to traumatic brain injury) [2]. Stroke is characterized by sudden onset and neurological deficits that are typically focal, manifested by symptoms such as hemiplegia, language disorders, and disturbances of consciousness, among others [2].

2.1.2. Epidemiology of Stroke

Stroke is a leading cause of mortality and disability worldwide. On average, there are approximately 200 new cases per 100,000 population annually, with a prevalence rate of 500–600 per 100,000 population [17]. The incidence increases with age; however, a trend toward younger onset has become increasingly evident, with patients under 40 years of age accounting for 5.8% in China and being significantly reported in developed countries [10], [11], [17].

2.1.3. Causes and Classification of Stroke

Common causes of stroke include atherosclerosis, hypertension, cardiovascular diseases, coagulation disorders, diabetes mellitus, and other cerebrovascular pathologies [4]. According to the TOAST classification, cerebral infarction is divided into five etiological groups based on clinical features, imaging findings, and paraclinical examinations (Table 1) [1].

Table 1. Classification of Causes of Cerebral Infarction According to TOAST

Characteristics	Large-artery atherosclerosis	Cardioembolism	Small-artery occlusion	Other causes
Clinical features				
– Cortical or cerebellar dysfunction	+	–	–	+/–
– Lacunar syndrome	–	–	+	+/–
Imaging findings				
– Cortical, cerebellar, brainstem, subcortical infarction > 1.5 cm	+	+	–	+/–
– Subcortical, brainstem infarction < 1.5 cm	–	–	+	+/–
Other paraclinical findings				
– Extracranial internal carotid artery stenosis	+	–	–	–
– Cardiac embolic source	–	+	–	–
– Other abnormalities	–	–	–	+

(Source: Clinical Neurology Handbook, 2017 [1])

2.1.4. Post-Stroke Functional Disorders and Disability

Among post-stroke functional disorders, motor impairment-especially hemiplegia-is the most common sequela and plays a decisive role in determining quality of life [1]. Hemiplegia may be asymmetrical or symmetrical depending on the lesion location. In addition, patients may experience sensory, language, visual, and consciousness disorders [1], [2].

Stroke is associated with a high rate of disability, with 50–80% of patients left with sequelae, among which motor impairment accounts for the majority [10], [17].

2.2. Motor Rehabilitation After Stroke According to Modern Medicine

2.2.1. Mechanisms of Functional Recovery

Post-stroke rehabilitation is based on mechanisms including neuroplasticity, utilization of intact brain regions, axonal growth, and reduction of cerebral edema [21], [22]. Most recovery processes occur within the first three months, which coincides with the intervention period of the present study.

2.2.2. Sequence and Timing of Motor Recovery

According to the Frenchay study, basic motor functions such as bowel and bladder control, self-feeding, ambulation, and personal activities of daily living recover in a specific sequence (Table 2) [22]. After six months, motor recovery potential decreases markedly; therefore, early intervention and the combination of multiple therapeutic modalities are key factors [8], [19], [27], [31].

Table 2. Sequence of Motor Recovery Over Time

Time after stroke	1 week	3 weeks	6 months
Number of patients assessed	561	572	494
Proportion	%	%	%
1. Voluntary bowel control	69	87	93
2. Voluntary bladder control	56	76	89
3. Hair grooming	44	73	87
4. Personal hygiene	32	61	80
5. Self-feeding	32	62	77
6. Transfer from bed to armchair	30	58	81
7. Independent walking	27	60	85
8. Independent dressing	21	49	69
9. Stair climbing	20	47	65
10. Independent bathing	14	35	51

2.2.3. Principles and Strategies of Modern Rehabilitation Treatment

Post-stroke rehabilitation should be implemented early, comprehensively, with individualized approaches, and based on task-oriented training, supportive environments, and stimulation of neuroplasticity [24], [28], [29], [30], [36].

2.3. Traditional Medicine Perspectives on Stroke and Post-Stroke Sequelae

2.3.1. Concept of "Trung Phong"

According to traditional medicine, stroke belongs to the category of "Trung phong" (wind stroke), with manifestations such as sudden coma, hemiplegia, deviation of the mouth and eyes, and aphasia [4], [35].

2.3.2. Causes and Pathogenesis

The main causes are internal injuries, dysfunction of the Zang–Fu organs, and deficiency of qi and blood, leading to the combined involvement of wind, fire, phlegm, and blood stasis in disease development [3], [4].

2.3.3. Common Syndromes in the Post-Stroke Stage

In the post-stroke stage, commonly encountered syndromes include Kidney Yin deficiency, combined Kidney Yin–Yang deficiency, and phlegm-dampness, among which Kidney Yin deficiency is the central syndrome addressed in this study [4].

2.4. Kidney Yin Deficiency and Diagnostic Criteria in the Study

Kidney Yin plays a role in nourishment, regulation, and maintenance of Yin–Yang balance in the body. In the study by Bui Chi Hieu et al. (1993), Kidney Yin deficiency was identified based on three syndromic groups: nervous excitation, increased catabolism, and impaired nourishment [13].

In this study, patients were diagnosed with Kidney Yin deficiency when all three syndromic groups were present, and each group included at least two symptoms.

2.5. Combined Treatment Methods Applied in the Study

2.5.1. Modified Acupuncture

Modified acupuncture is a method that integrates traditional medicine and modern medicine, focusing on selective stimulation of weakened or paralyzed muscle groups to enhance neuroplasticity and motor recovery effectiveness [12], [14], [16].

2.5.2. Luc Vi Formulation

Liuwei Dihuang Wan is a classic formula for nourishing Yin and tonifying the Kidney, with effects on improving the clinical manifestations of Kidney Yin deficiency. The components of the formula have clear pharmacological bases according to both traditional medicine and modern medicine (Table 3) [5], [6], [15], [18], [23].

Table 3. Analysis of the Liuwei Formula

Herbal component	Traditional medicine pharmacology [6], [15], [18], [23]	Modern medicine pharmacology [5]
Shu Di Huang	Nourishes Kidney Yin, tonifies the Kidney, enriches the blood	Anti-inflammatory, antihypertensive, hemostatic, hepatoprotective, diuretic, immunosuppressive
Huai Shan	Tonifies the Spleen and Stomach, tonifies the Lung and Kidney, generates fluids and relieves thirst	Enhances assimilation and anabolic processes

Shan Zhu Yu	Warms and tonifies the Liver and Kidney, astringes essence and stops sweating	Antibacterial, diuretic, antihypertensive, mild hypoglycemic
Mu Dan Pi	Clears heat from the blood, disperses blood stasis; treats heat entering the nutritive level	Anti-inflammatory, antibacterial, analgesic, sedative, anticonvulsant, antipyretic via central nervous system inhibition, anti-ulcer, inhibits gastric secretion
Fu Ling	Promotes urination, leaches out dampness, tonifies the Spleen, calms the Mind	Diuretic, immunoenhancing, anticancer, sedative, hypoglycemic, hepatoprotective, anti-gastric ulcer, antibacterial
Ze Xie	Clears and drains damp-heat from the Bladder	Diuretic, lipid-lowering, improves hepatic lipid metabolism and prevents fatty liver, mild antihypertensive, anticoagulant

2.5.3. Bo Duong Hoan Ngu Decoction

Bo Duong Hoan Ngu Decoction has the effects of tonifying qi, activating blood circulation, and unblocking the channels, and is a principal formula in the treatment of post-stroke hemiplegia [20]. Modern pharmacological studies indicate that the formula improves cerebral circulation, has anti-inflammatory effects, and prevents thrombosis formation (Table 4) [5].

Table 4. Analysis of the Bo Duong Hoan Ngu Decoction

Herbal component [20]	Traditional medicine pharmacology [6], [15], [18]	Modern medicine pharmacology [5]
Huang Qi	Tonifies qi, raises Yang qi of the Spleen, stops sweating, promotes urination	Enhances immune function, promotes metabolic processes, diuretic, increases myocardial contractility, antihypertensive, antibacterial, hepatoprotective
Dang Gui	Tonifies and invigorates blood, moistens dryness, promotes intestinal movement, regulates blood, unblocks channels	Increases hemoglobin and red blood cells, dilates coronary arteries, reduces platelet aggregation, analgesic, anti-inflammatory, sedative, relaxes bronchial smooth muscle, hepatoprotective, diuretic, antibacterial, laxative
Chi Shao	Dispels pathogenic factors, activates blood	Antispasmodic for intestines, stomach, and uterus; antibacterial; dilates coronary arteries; inhibits platelet aggregation; prevents thrombosis; increases coronary blood flow; anti-inflammatory; antipyretic
Chuan Xiong	Activates blood, alleviates pain, regulates qi, dispels wind	Sedative effects on the central nervous system; peripheral vasodilation; increases coronary and cerebral blood flow; long-term antihypertensive; reduces cerebral edema; inhibits platelet aggregation and thrombus formation; antibacterial; sedative
Tao Ren	Breaks up blood stasis, moves stagnation, moistens dryness, promotes bowel movement	Vasodilation, increases blood flow, inhibits platelet aggregation, uterine contraction, laxative, anti-inflammatory, antitussive
Hong Hua	Breaks up blood stasis, generates blood	Antihypertensive, increases myocardial contractility, contracts bronchial smooth muscle, increases uterine contractility, inhibits platelet aggregation
Di Long	Clears heat, calms convulsions, promotes urination, detoxifies	Antipyretic, sedative, bronchodilatory, slow but sustained antihypertensive effect, shortens inflammatory duration, promotes wound healing, anticonvulsant, anti-thrombotic

2.5.4. Physical Therapy Exercises

Physical therapy plays a central role in motor rehabilitation, helping to improve muscle strength, range of motion, and activities of daily living in patients with post-stroke hemiplegia [7], [8], [12].

3. Research Methods

Study design: An open-label, randomized, controlled clinical trial.

Inclusion criteria:

All patients meeting both of the following groups of criteria were selected:

Criteria for post-stroke hemiplegia

Duration from stroke onset to study participation of ≥ 3 months
Conscious and cooperative with treating physicians
Barthel Index ≤ 60 (moderate, severe, and very severe groups)
Unable to walk 10 meters without assistive devices or human support

Diagnostic criteria for Kidney Yin deficiency [13]
Patients diagnosed with Kidney Yin deficiency were required to present all three of the following syndromic groups, with at least two symptoms in each group:
Syndrome of nervous excitation: headache, dizziness, blurred vision, insomnia, restlessness, fright, palpitations
Syndrome of increased catabolic processes: night heat, thready rapid pulse, hot palms and soles, night sweating, flushed cheeks, dry lips, dry tongue, red tongue, dry mouth, constipation, scanty urination
Syndrome of impaired nourishment: emaciation, low back pain, loose teeth

Exclusion criteria
Patients with severe debilitation or extensive ulceration and infection
Patients currently using medications included in the study treatment protocols, or those who had discontinued such medications for less than 15 days (Western medicines in the treatment protocol were defined as drugs that improve cerebral circulation; traditional medicines in the protocol included Bo Duong Hoan Ngu Decoction, Luc Vi formulation, or formulas with similar effects. Western medicines used by patients for comorbid conditions such as hypertension, diabetes mellitus, dyslipidemia, myocardial ischemia, etc., were allowed to be continued.)

Study site
At Thien Nam Traditional Medicine Facility – Nha Trang, Ngo Hanh Traditional Medicine Facility – Nha Trang, and Nhan Dao General Clinic, Kinh 7 – Kien Giang.
Sample size estimation (open-label, randomized, controlled clinical trial)
Sample size was estimated using the formula for comparing two proportions:

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}}\sqrt{2\bar{p}(1-\bar{p})} + Z_{1-\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\right)^2}{(p_1-p_2)^2}$$

Where:
- n: sample size
- $Z_{\alpha/2}$: Z value of the normal distribution corresponding to probability α/2
- $\alpha=0.05 \Rightarrow Z_{1-\alpha/2}=1.96$
- Z_β : Z value of the normal distribution corresponding to probability β
- $\beta=0.1 \Rightarrow Z1-\beta=1.28$
- $\bar{p}=(p1+p2)/2$
- p_1: treatment response rate reported in previous studies; p1=18.63%≈0.19 [12]
- p_2: expected treatment response rate in the present study; p2=45%=0.45 ⇒n=74 (subjects)

The required sample size was determined as n ≥ 74 subjects per group.
Measurement methods and data collection tools
Group allocation and randomization

Group assignment
Patients meeting the inclusion and exclusion criteria were allocated into two groups:
Group 1: 76 patients with post-stroke hemiplegia ≥ 3 months who met the diagnostic criteria for Kidney Yin deficiency were treated with a combination of modified acupuncture, physical therapy exercises, and the Bo Duong Hoan Ngu formulation.
Group 2: 76 patients with post-stroke hemiplegia ≥ 3 months who met the diagnostic criteria for Kidney Yin deficiency were treated with a combination of modified acupuncture, physical therapy exercises, the Bo Duong Hoan Ngu formulation, and the Luc Vi formulation.

Randomization
A simple randomization method was applied. A total of 152 numbers from 1 to 152 were prepared in advance and placed into a sealed box. Each patient randomly drew one number: patients who drew odd numbers were assigned to Group 1, whereas those who drew even numbers were assigned to Group 2. After being drawn, each number was permanently removed from the box.

Intervention methods
Group 1 consisted of 76 patients treated with a combined protocol of modified acupuncture, physical therapy exercises, and the Bo Duong Hoan Ngu formulation.
Group 2 consisted of 76 patients treated with a combined protocol of modified acupuncture, physical therapy exercises, the Bo Duong Hoan Ngu formulation, and the Luc Vi formulation.

Data analysis
Data were coded, entered, and analyzed using STATA version 14.0. Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as means and standard deviations. Appropriate statistical tests (Chi-square test, Fisher's exact test, t-test, and Z-test) were applied to compare differences

between groups and between pre- and post-treatment measurements. A p-value < 0.05 was considered statistically significant.

Research ethics

The study was conducted in accordance with ethical principles for biomedical research and was approved by the Biomedical Research Ethics Committee of the University of Medicine and Pharmacy at Ho Chi Minh City, under Decision No. 412/ĐHYD-HĐĐĐ. All participants were fully informed about the study and provided voluntary consent. Confidentiality of personal information was strictly maintained, and participants had the right to withdraw from the study at any time without affecting their treatment.

4. Research Results and Discussion

4.1. General Characteristics of the Study Sample

The total number of patients was 152, including 94 males and 58 females, aged from 39 to 83 years. All patients were treated and followed for four treatment courses (40 days) and were randomly allocated into two groups:

Group 1: 76 patients with post-stroke hemiplegia after 3 months accompanied by Kidney Yin deficiency, treated with modified acupuncture, physical therapy exercises, in combination with the Bo Duong Hoan Ngu formulation.

Group 2: 76 patients with post-stroke hemiplegia after 3 months accompanied by Kidney Yin deficiency, treated with modified acupuncture, physical therapy exercises, in combination with the Bo Duong Hoan Ngu formulation and the Luc Vi formulation.

4.1.1. Age Group Characteristics of the Study Sample

Table 5. Age Group Characteristics of the Study Sample

Age group	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
≤ 50 years	9	11.8	13	17.1	0.605*
51–70 years	58	76.3	53	69.7	
> 70 years	9	11.8	10	13.2	

* Chi-square test

The results in Table 5 show that the age group distribution of patients in the two study groups was relatively comparable. The 51–70 age group accounted for the highest proportion in both groups, at 76.3% in Group 1 and 69.7% in Group 2, reflecting the common characteristics of stroke patients in middle-aged and elderly populations. The proportions of patients aged ≤50 years and >70 years in both groups were low and showed no marked differences. The mean age of Group 1 (61.1 ± 8.5 years) and Group 2 (60.3 ± 9.7 years) did not differ statistically significantly (p > 0.05). This indicates that the two groups were comparable in terms of age, ensuring sample homogeneity and providing a reliable basis for comparing treatment effectiveness between the two groups.

4.1.2. Sex Characteristics of the Study Sample

Table 6. Sex Characteristics of the Study Sample

Sex	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
Female	28	36.8	30	39.5	0.738*
Male	48	63.2	46	60.5	

* Chi-square test

The male-to-female ratios in the two groups were comparable. There was no statistically significant difference in sex distribution between Group 1 and Group 2 (p > 0.05).

4.1.3. Coma Characteristics of the Study Sample

Table 7. Coma Characteristics of the Study Sample

Coma status	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
No	53	69.7	49	64.5	0.490*
Yes	23	30.3	27	35.5	

* Chi-square test

The number of patients with coma was relatively evenly distributed in both treatment groups. There was no statistically significant difference in the proportion of patients with coma between the two groups (p > 0.05).

4.1.4. Duration Since Stroke of the Study Sample

Table 8. Duration Since Stroke of the Study Sample

Duration since stroke	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
3–<6 months	46	60.5	47	61.8	0.341*
6–12 months	14	18.4	19	25	
>12 months	16	21.1	10	13.2	

* Chi-square test
The difference in the duration since stroke between the two groups was not statistically significant (p > 0.05).

4.1.5. Number of Stroke Episodes in the Study Sample

Table 9. Number of Stroke Episodes in the Study Sample

Number of stroke episodes	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
First episode	63	82.9	63	82.9	1.000*
Second episode	13	17.1	12	15.8	
Third episode	0	0	1	1.3	

* Fisher's exact test
The numbers of patients experiencing first, second, and third stroke episodes were comparable between the two groups. The difference in the number of stroke episodes between the two groups was not statistically significant (p > 0.05).

4.1.6. Comorbidities of the Study Sample

Table 10. Comorbidities of the Study Sample

Comorbidity	Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	
No comorbidity	18	23.7	16	21.1	0.697
With comorbidities	58	76.3	60	79	
Hypertension	54	93.1	52	86.7	0.247
Diabetes mellitus	13	22.4	8	13.3	0.197
Dyslipidemia	25	43.1	20	33.3	0.275
Ischemic heart disease	4	6.9	4	6.7	1.00*

Chi-square test
* Fisher's exact test
Comment: Differences in the proportions of comorbidities between the two groups were not statistically significant (p > 0.05).

4.1.7. Characteristics of Kidney Yin Deficiency in the Study Sample

Table 11. Kidney Yin Deficiency Patterns of the Study Sample Before Treatment

Kidney Yin deficiency patterns before treatment	Overall (n = 152)		Group 1 (n = 76)		Group 2 (n = 76)		p-value
	N	%	N	%	N	%	
Syndrome of nervous excitation	152	100	76	100	76	100	
Headache	117	77	58	76.3	59	77.6	0.847
Dizziness	88	57.9	43	56.6	45	59.2	0.742
Blurred vision	83	54.6	42	55.3	41	54	0.871
Insomnia	130	85.5	62	81.6	68	89.5	0.167
Restlessness	119	78.3	57	75	62	81.6	0.325
Fright	20	13.2	9	11.8	11	14.5	0.631
Palpitations	31	20.4	15	19.7	16	21.1	0.84
Syndrome of increased catabolic processes	152	100	76	100	76	100	
Night heat	102	67.1	50	65.8	52	68.4	0.73
Thready rapid pulse	71	46.7	34	44.7	37	48.7	0.626
Hot palms and soles	47	30.9	26	34.2	21	27.6	0.38
Night sweating	35	23	16	21.1	19	25	0.563
Flushed cheeks	50	32.9	28	36.8	22	29	0.3
Dry lips	88	57.9	46	60.5	42	55.3	0.511
Dry tongue	68	44.7	30	39.5	38	50	0.192
Red tongue	109	71.7	51	67.1	58	76.3	0.207
Dry mouth	77	50.66	38	50	39	51.32	0.871
Constipation	105	69.1	53	69.7	52	68.4	0.861
Scanty urination	41	27	20	26.3	21	27.6	0.855
Syndrome of impaired nourishment	152	100	76	100	76	100	
Emaciation	89	58.6	48	63.2	41	54	0.249
Low back pain	142	93.4	70	92.1	72	94.7	0.513
Loose teeth	82	54	38	50	44	57.9	0.329

Overall Kidney Yin deficiency pattern	152	100	76	100	76	100	

Chi-square test

Before treatment, the manifestations of Kidney Yin deficiency (across all three syndromic groups: nervous excitation, increased catabolic processes, and impaired nourishment) did not differ statistically significantly between Group 1 and Group 2 (all 21 symptoms had $p > 0.05$).

Among these, the most frequently observed symptom was low back pain (142 cases), followed by insomnia (130), restlessness (119), headache (117), red tongue (109), constipation (105), and night heat (102). The least frequent symptoms were fright (20), palpitations (31), night sweating (35), and scanty urination (41). Differences in the prevalence of each symptom between the two groups before treatment were not statistically significant (all $p > 0.05$).

4.2. Supportive Effect of the Luc Vi Preparation on Motor Recovery in the Regimen of Modified Acupuncture, Physical Therapy, and the Bo Duong Hoan Ngu Preparation

4.2.1. Effect on Overall Motor Recovery Based on the Barthel Index

Table 12. Effect of motor recovery in Groups 1 and 2 based on the proportion of good and fair outcomes according to Barthel classification

Barthel classification	**Group 1 (n=76)**		**Group 2 (n=76)**		**p value**
	N	%	N	%	
Good + Fair	31	40.8	42	55.3	0.074
Not achieved	45	59.2	34	44.7	

Chi-square test

Before treatment, all patients had a Barthel Index ≤ 60 (classified as moderate, poor, or very poor). After 40 days of treatment, the proportion of patients achieving fair and good outcomes according to the Barthel classification increased in both groups; Group 2 increased to 42 patients (55.3%), whereas Group 1 increased to only 31 patients (40.8%). The difference in the proportion of patients achieving fair and good outcomes according to the Barthel classification between Group 1 and Group 2 was not statistically significant ($p > 0.05$).

Table 13. Effect of overall motor function recovery in Groups 1 and 2 based on the Barthel Index

Barthel Index	**Before treatment**	**After 10 days**		**After 20 days**		**After 30 days**		**After 40 days**	
	Mean ± SD	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p
Group 1	40.3 ± 13.1	44.9 ± 14.6	<0.001	51.2 ± 15.9	<0.001	55.7 ± 17.1	<0.001	58.4 ± 17.8	<0.001
Group 2	40.7 ± 13.7	48.7 ± 16.4	<0.001	56.3 ± 17.6	<0.001	62.5 ± 18.4	<0.001	66.4 ± 18.2	<0.001
p	0.832*	0.138*		0.061*		0.020*		0.007*	

* t-test assuming equal variances

Paired t-test comparing before and after treatment

After each treatment course, overall motor function improved in both groups. The Barthel Index in Groups 1 and 2 increased significantly ($p < 0.001$). Before treatment, the Barthel Index was comparable between the two groups ($p > 0.05$). However, after 40 days of treatment, the Barthel Index in Group 2 increased significantly faster than in Group 1 ($p < 0.05$).

4.2.2. Effect on Recovery of Paretic Upper Limb Motor Function in Groups 1 and 2 Based on the Manual Dexterity Test

Table 14. Proportion of patients able to perform the manual dexterity test (number of rings placed within 1 minute) in Groups 1 and 2

Proportion of patients placing rings within 1 minute	**Group 1 (n=76)**		**Group 2 (n=76)**		**p value**
	N	%	N	%	
Before treatment	19	25	21	27.6	0.713*
Course 1	24	31.6	30	39.5	0.309*
Course 2	31	40.8	36	47.4	0.414*
Course 3	34	44.7	40	52.6	0.330*
Course 4	35	46.1	42	55.3	0.256*
p value	0.007**		<0.001**		

* Chi-square test

** Z-test comparing before and after treatment

After 40 days of treatment, the number of patients able to perform the manual dexterity test increased significantly in both groups ($p < 0.05$). Before treatment, the number of patients able to perform the manual dexterity test was comparable between Group 1 and Group 2 ($p > 0.05$). After treatment, Group 1 increased from 19 to 35 patients (increase of 21.1%), and Group 2 increased from 21 to 42 patients (increase of 27.7%). The difference in the proportion of patients able to perform the manual dexterity test between the two groups was not statistically significant ($p > 0.05$).

Table 15. Effect of recovery of paretic upper limb motor function in Groups 1 and 2 based on the manual dexterity test (number of rings placed within 1 minute)

Manual dexterity test	Before treatment	After 10 days		After 20 days		After 30 days		After 40 days	
	Mean ± SD	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p	Mean ± SD	p
Group 1	0.64 ± 1.33	1.32 ± 2.54	<0.001	2.37 ± 3.89	<0.001	3.50 ± 5.19	<0.001	4.55 ± 6.12	<0.001
Group 2	0.88 ± 1.61	2.20 ± 3.08	<0.001	4.08 ± 5.20	<0.001	6.11 ± 7.29	<0.001	7.78 ± 8.62	<0.001
p	0.325*	0.056*		0.023**		0.012**		0.009**	

* t-test assuming equal variances

** t-test assuming unequal variances

Paired t-test comparing before and after treatment

After each treatment course, paretic upper limb motor function improved in both groups. The mean number of rings placed within 1 minute increased significantly in both groups ($p < 0.001$), increasing from 0.64 ± 1.33 to 4.55 ± 6.12 in Group 1 and from 0.88 ± 1.61 to 7.78 ± 8.62 in Group 2.

Before treatment, the mean number of rings placed within 1 minute was not significantly different between Group 1 and Group 2 ($p > 0.05$). From after Course 2 (20 days of treatment), the mean number of rings placed within 1 minute in Group 2 increased significantly faster than in Group 1 ($p < 0.05$).

4.2.3. Effect on Recovery of Paretic Lower Limb Motor Function in Groups 1 and 2 Based on Time to Walk 10 m (With or Without Assistive Devices)

Table 16. Proportion of patients able to walk 10 m in Groups 1 and 2

Proportion of patients able to walk 10 m	Group 1 (n=76)		Group 2 (n=76)		p value
	N	%	N	%	
Before treatment	37	48.7	35	46.1	0.745*
Course 1	41	54	45	59.2	0.513*
Course 2	45	59.2	50	65.8	0.402*
Course 3	47	61.8	53	69.7	0.305*
Course 4	49	64.5	55	72.4	0.295*
p value	0.05**		0.001**		

* Chi-square test comparing proportions between groups

** Z-test comparing proportions before treatment and after Course 4

After 40 days of treatment, the number of patients able to walk 10 m increased significantly in both Group 1 and Group 2 ($p < 0.05$). Before treatment, the number of patients able to walk 10 m was comparable between the two groups ($p > 0.05$). After treatment, Group 1 increased from 37 to 49 patients (increase of 15.8%), whereas Group 2 increased from 35 to 55 patients (increase of 26.3%). The difference in the proportion of patients able to walk 10 m between the two groups was not statistically significant ($p > 0.05$).

Table 17. Effect of recovery of paretic lower limb motor function in Groups 1 and 2 based on time to walk 10 m

Time to walk 10 m	Before treatment	After treatment 10 days		After treatment 20 days		After treatment 30 days		After treatment 40 days	
	Mean	Mean	p	Mean	p	Mean	p	Mean	p
Group 1	N = 37 78.95 ± 19.56	N = 41 69.51 ± 25.35	<0.001	N = 45 58.64 ± 22.60	<0.001	N = 47 49.23 ± 21.10	<0.001	N = 49 42.92 ± 21.15	<0.001
Group 2	N = 35 78.26 ± 19.95	N = 45 67.53 ± 23.63	<0.001	N = 50 54.62 ± 19.67	<0.001	N = 53 44.91 ± 25.98	<0.001	N = 55 33.05 ± 12.07	<0.001
P	0.883*	0.709*		0.356**		0.366**		0.005**	

* t-test assuming equal variances
** t-test assuming unequal variances
Paired t-test comparing before and after treatment
After each treatment course, paretic limb motor function improved in both groups. The mean time required to walk 10 m decreased significantly in both groups ($p < 0.001$), decreasing from 78.95 ± 19.56 seconds to 42.92 ± 21.15 seconds in Group 1 and from 78.26 ± 19.95 seconds to 33.05 ± 12.07 seconds in Group 2.
Before treatment, the mean time required to walk 10 m was comparable between the two groups. After 40 days of treatment, the mean time required to walk 10 m in Group 2 decreased significantly faster than in Group 1 ($p < 0.05$).

4.3. Effect on Improvement of the Kidney Yin Deficiency Pattern With the Addition of the Luc Vi Preparation in the Regimen of Modified Acupuncture, Physical Therapy, and the Bo Duong Hoan Ngu Preparation

4.3.1. Effect on Improvement of the Kidney Yin Deficiency Pattern in Group 1

Table 18. Effect of improvement in the Kidney Yin Deficiency pattern across treatment courses in Group 1

Number of patients presenting symptoms / Kidney Yin Deficiency pattern	**Before treatment**	**After 10 days**		**After 20 days**		**After 30 days**		**After 40 days**	
	N	N	p	N	p	N	p	N	p
Irritative neurological syndrome	76	76		76		75	0.316	71	0.023
Headache	58	56	0.708	46	0.036	32	<0.001	28	<0.001
Dizziness	43	42	0.87	34	0.144	31	0.052	32	0.074
Blurred vision	42	41	0.871	31	0.074	24	0.003	23	0.002
Insomnia	62	61	0.837	59	0.546	56	0.243	53	0.089
Restlessness	57	58	0.85	51	0.283	44	0.026	42	0.011
Startle	9	7	0.597	5	0.262	0	0.002	0	0.002
Palpitations	15	13	0.676	10	0.274	6	0.034	4	0.007
Hypercatabolic syndrome	76	76		76		75	0.316	74	0.155
Night heat	50	48	0.735	44	0.316	41	0.136	37	0.033
Thready rapid pulse	34	34	1	34	1	33	0.87	31	0.623
Hot palms and soles	26	26	1	26	1	26	1	23	0.603
Night sweats	16	14	0.684	11	0.289	7	0.042	7	0.042
Flushed cheeks	28	21	0.224	11	0.002	8	<0.001	8	<0.001
Dry lips	46	42	0.511	27	0.002	22	<0.001	22	<0.001
Dry tongue	30	28	0.738	28	0.738	25	0.399	20	0.084
Red tongue	51	51	1	49	0.732	48	0.61	47	0.498
Dry mouth	38	34	0.516	27	0.071	17	<0.001	16	<0.001
Constipation	53	52	0.861	46	0.234	43	0.093	34	0.002
Scanty urination	20	20	1	20	1	18	0.708	16	0.445
Nutritional deficiency syndrome	76	75	0.316	70	0.012	67	0.002	59	<0.001
Emaciation	48	48	1	46	0.738	44	0.507	41	0.249
Low back pain	70	69	0.772	66	0.29	61	0.034	55	0.002
Loose teeth	38	38	1	38	1	41	0.626	40	0.746
Kidney Yin Deficiency pattern	76	75	0.316	70	0.012	66	0.001	56	<0.001

Z-test comparing proportions before and after treatment
After 10 days of treatment, manifestations of Kidney Yin Deficiency showed no improvement, and all changes were not statistically significant ($p > 0.05$).
After 20 days of treatment, 3 out of 21 symptoms showed statistically significant improvement, including headache, flushed cheeks, and dry lips ($p < 0.05$). The Nutritional Deficiency Syndrome decreased from 76 to 70 cases ($p = 0.012$); therefore, the Kidney Yin Deficiency pattern also decreased in 6 patients, with this difference being statistically significant ($p < 0.05$).

After 30 days of treatment, 10 out of 21 symptoms showed statistically significant improvement ($p < 0.05$). Specifically, in the Irritative Neurological Syndrome, 5 of 7 symptoms decreased, including headache, blurred vision, restlessness, startle, and palpitations; in the Hypercatabolic Syndrome, 4 of 11 symptoms decreased, including night sweats, flushed cheeks, dry lips, and dry mouth; in the Nutritional Deficiency Syndrome, 1 of 3 symptoms decreased, namely low back pain. The proportion of the Kidney Yin Deficiency pattern further decreased by 4 cases ($p < 0.05$).
After 40 days of treatment, 12 out of 21 symptoms showed statistically significant improvement ($p < 0.05$). Specifically, in the Irritative Neurological Syndrome, 5 of 7 symptoms decreased (including headache, blurred vision, restlessness, startle, and palpitations); in the Hypercatabolic Syndrome, 6 of 11 symptoms decreased (including night heat, night sweats, flushed cheeks, dry lips, dry mouth, and constipation); in the Nutritional Deficiency Syndrome, 1 of 3 symptoms decreased, namely low back pain. The Irritative Neurological Syndrome decreased from 76 to 71 cases, and the Nutritional Deficiency Syndrome decreased from 76 to 59 cases; the improvement of these two syndromes before and after 40 days of treatment was statistically significant ($p < 0.05$). The Kidney Yin Deficiency pattern decreased by 20 cases (from 76 to 56), and the difference before and after treatment was statistically significant ($p < 0.001$).

4.3.2. Effectiveness in Improving the Kidney Yin Deficiency Condition in Group 2

Table 19. Effectiveness in Improving the Kidney Yin Deficiency Condition Across Treatment Courses in Group 2

Number of patients presenting symptoms / Kidney Yin deficiency condition	**Before treatment**	**After 10 days of treatment**	**After 20 days of treatment**	**After 30 days of treatment**	**After 40 days of treatment**
	N	N	p	N	p
Nervous excitation syndrome	76	76		72	0.043
Headache	59	55	0.454	42	0.004
Dizziness	45	38	0.254	24	<0.001
Blurred vision	41	31	0.104	19	<0.001
Insomnia	68	67	0.797	58	0.031
Restlessness	62	59	0.546	51	0.041
Fright	11	11	1	8	0.462
Palpitations	16	12	0.403	6	0.021
Increased catabolic process syndrome	76	76		70	0.012
Night heat	52	45	0.237	33	0.002
Thready rapid pulse	37	34	0.626	31	0.328
Hot palms and soles	21	21	1	15	0.252
Night sweating	19	20	0.853	13	0.233
Flushed cheeks	22	14	0.127	8	0.004
Dry lips	42	40	0.745	29	0.035
Dry tongue	38	34	0.516	25	0.032
Red tongue	58	56	0.708	46	0.036
Dry mouth	39	36	0.627	19	<0.001
Constipation	52	51	0.862	42	0.095
Scanty urination	21	19	0.713	15	0.252
Impaired nourishment syndrome	76	71	0.023	60	<0.001
Emaciation	41	41	1	38	0.626
Low back pain	72	67	0.147	57	<0.001
Loose teeth	44	44	1	44	1
Kidney Yin deficiency condition	76	71	0.023	56	<0.001

Z-test for comparison of proportions before and after treatment
After 10 days of treatment, the impaired nourishment syndrome decreased from 76 to 71 cases ($p = 0.023$); therefore, the Kidney Yin deficiency condition also decreased in 5 patients. This difference was statistically significant ($p < 0.05$).
After 20 days of treatment, 13/21 symptoms showed statistically significant improvement ($p < 0.05$). Specifically, in the nervous excitation syndrome, 6/7 symptoms improved except fright; in the increased catabolic process syndrome, 6/11 symptoms improved (excluding thready rapid pulse, hot palms and soles, night sweating, constipation, and scanty urination); in the impaired nourishment syndrome, 1/3 symptoms improved, namely low back pain.
After 30 days of treatment, most symptoms (18/21) showed statistically significant improvement ($p < 0.05$), except scanty urination (increased catabolic process syndrome), emaciation and loose teeth (impaired nourishment syndrome). All three syndromes-nervous excitation, increased catabolic process, and impaired nourishment-showed

statistically significant improvement ($p < 0.001$). The proportion of patients with Kidney Yin deficiency decreased from 76 to 32 cases, with a statistically significant difference ($p < 0.001$).

After 40 days of treatment, 20/21 symptoms showed statistically significant improvement ($p < 0.05$), except loose teeth (impaired nourishment syndrome). All three syndromes-nervous excitation, increased catabolic process, and impaired nourishment-showed statistically significant improvement ($p < 0.001$). The Kidney Yin deficiency condition decreased by 56 cases (from 76 to 20), and this difference was statistically significant ($p < 0.001$).

4.3.3. Comparison of the Effectiveness in Improving the Kidney Yin Deficiency Condition Between Groups 1 and 2

Table 20. Comparison of the Effectiveness in Improving the Kidney Yin Deficiency Condition Across Treatment Courses Between Groups 1 and 2

Number of patients presenting symptoms / Kidney Yin deficiency condition	**Before treatment**	**After 10 days**	**After 20 days**	**After 30 days**	**After 40 days**
	Group 1	Group 2	Group 1	Group 2	p
Nervous excitation syndrome	76	76	76	76	
Headache	58	59	56	55	0.855
Dizziness	43	45	42	38	0.516
Blurred vision	42	41	41	31	0.104
Insomnia	62	68	61	67	0.182
Restlessness	57	62	58	59	0.847
Fright	9	11	7	11	0.315
Palpitations	15	16	13	12	0.827
Increased catabolic process syndrome	76	76	76	76	
Night heat	50	52	48	45	0.618
Thready rapid pulse	34	37	34	34	1
Hot palms and soles	26	21	26	21	0.38
Night sweating	16	19	14	20	0.243
Flushed cheeks	28	22	21	14	0.177
Dry lips	46	42	42	40	0.745
Dry tongue	30	38	28	34	0.322
Red tongue	51	58	51	56	0.374
Dry mouth	38	39	34	36	0.745
Constipation	53	52	52	51	0.862
Scanty urination	20	21	20	19	0.853
Impaired nourishment syndrome	76	76	75	71	0.209*
Emaciation	48	41	48	41	0.249
Low back pain	70	72	69	67	0.597
Loose teeth	38	44	38	44	0.329
Kidney Yin deficiency condition	76	76	75	71	0.209*

Chi-square test

*Fisher's exact test

After 10 days of treatment, there was no difference in the proportion of symptoms of Kidney Yin deficiency between Group 1 and Group 2 ($p > 0.05$). Improvements in the three syndromes-nervous excitation, increased catabolic process, impaired nourishment-and the Kidney Yin deficiency condition were also not statistically different between the two groups ($p > 0.05$).

After 20 days of treatment, only 2/21 symptoms differed between Group 1 and Group 2, namely blurred vision and hot palms and soles ($p < 0.05$). Improvements in the increased catabolic process syndrome, impaired nourishment syndrome, and the Kidney Yin deficiency condition differed significantly between the two groups ($p < 0.05$).

After 30 days of treatment, 8/21 symptoms differed between Group 1 and Group 2 ($p < 0.05$). Specifically, in the nervous excitation syndrome, 2/7 symptoms differed (dizziness and insomnia); in the increased catabolic process syndrome, 4/11 symptoms differed (night heat, hot palms and soles, dry mouth, constipation); in the impaired nourishment syndrome, 2/3 symptoms differed (emaciation and low back pain). Improvements in all three syndromes and the Kidney Yin deficiency condition differed significantly between the two groups ($p < 0.001$).

After 40 days of treatment, 12/21 symptoms differed between Group 1 and Group 2 ($p < 0.05$), except blurred vision and palpitations (nervous excitation syndrome); thready rapid pulse, night sweating, flushed cheeks, dry lips, red tongue, scanty urination (increased catabolic process syndrome); and loose teeth (impaired nourishment syndrome). Improvements in all three syndromes and the Kidney Yin deficiency condition differed significantly between the two groups ($p < 0.001$).

4.4. Medical Incidents and Adverse Drug Reactions

Table 21. Medical Incidents

Adverse event	Overall (n = 152 × 40)	Group 1 (n = 76 × 40)	Group 2 (n = 76 × 40)	p value
	N	%	N	%
Bleeding causing subcutaneous bruising	43	0.71	21	0.69

Chi-square test

Throughout the monitoring and treatment period, only acupuncture-related medical incidents were recorded, consisting of 43 episodes of bleeding causing subcutaneous bruising (0.71%) out of 6,080 (152 × 40) sessions of modified acupuncture.

The incidence rate of bleeding causing subcutaneous bruising was similar between the two groups, with no statistically significant difference ($p > 0.05$).

Patients experiencing the above incident temporarily discontinued acupuncture at the affected acupoint for several days and were treated with an alternative acupoint appropriate to the treatment protocol. The bruises resolved spontaneously after a few days without additional intervention.

4.5. DISCUSSION

In this study, 152 patients with post-stroke hemiplegia after 3 months presenting with Kidney Yin deficiency were randomly allocated into two groups, each comprising 76 patients. Results in Section 4.1 showed that the two groups were comparable in baseline characteristics. The mean age was 61.1 ± 8.5 years in Group 1 and 60.3 ± 9.7 years in Group 2, with no statistically significant difference ($p > 0.05$). The proportion of males was 63.2% in Group 1 and 60.5% in Group 2; the proportions of patients with a history of coma were 30.3% and 35.5%, respectively; the duration of stroke was predominantly from 3 to less than 6 months, accounting for 60.5% in Group 1 and 61.8% in Group 2. None of these factors differed significantly between the groups ($p > 0.05$), indicating high homogeneity and suitability for comparison of treatment effects [1], [2], [10].

Regarding overall motor functional recovery, the Barthel Index increased markedly across treatment courses in both groups. In Group 1, the Barthel Index increased from 40.3 ± 13.1 points before treatment to 58.4 ± 17.8 points after 40 days; in Group 2, it increased from 40.7 ± 13.7 points to 66.4 ± 18.2 points. Improvements in both groups were statistically significant compared with baseline ($p < 0.001$). Notably, after 40 days, the Barthel Index in Group 2 was significantly higher than in Group 1 ($p = 0.007$), indicating that supplementation with the Luc Vi preparation enhanced the effectiveness of overall motor functional recovery [7], [19], [28].

For upper limb motor recovery, assessment using the dexterity test showed that the proportion of patients able to perform the test in Group 1 increased from 25.0% (19/76 patients) before treatment to 46.1% (35/76 patients) after 40 days, representing an increase of 21.1%. In Group 2, this proportion increased from 27.6% (21/76 patients) to 55.3% (42/76 patients), an increase of 27.7%. Although the difference between groups in the proportion of patients able to perform the test did not reach statistical significance ($p > 0.05$), the number of loops completed per minute increased more rapidly in Group 2 than in Group 1. Specifically, after 40 days, the mean number of loops in Group 1 reached 4.55 ± 6.12 loops/min, whereas Group 2 achieved a clearly higher value. These findings are consistent with the notion that improving baseline physical condition and nourishing Yin and Blood plays an important supportive role in fine motor recovery of the upper limb [8], [29].

Regarding lower limb motor recovery, after 40 days of treatment, the number of patients able to walk 10 meters in Group 1 increased from 37 to 49 (an increase of 15.8%), whereas in Group 2 it increased from 35 to 55 (an increase of 26.3%). Although the difference in the proportion of patients able to walk 10 meters between the two groups was not statistically significant ($p > 0.05$), the mean time required to walk 10 meters showed a clear difference. Before treatment, the time to walk 10 meters was 78.95 ± 19.56 seconds in Group 1 and 78.26 ± 19.95 seconds in Group 2 ($p > 0.05$). After 40 days, this time decreased to 42.92 ± 21.15 seconds in Group 1 and 33.05 ± 12.07 seconds in Group 2, with a statistically significant difference between groups ($p = 0.005$). This demonstrates that the group supplemented with the Luc Vi preparation achieved faster and more effective lower limb motor recovery [7], [19], [28].

Regarding improvement in the Kidney Yin deficiency condition, results in Sections 4.3 and 4.4 showed a clear difference between the two groups. After 20 days of treatment, the number of patients still presenting with Kidney Yin deficiency in Group 1 decreased from 76 to 70 cases (a reduction of 7.9%), whereas in Group 2 it decreased from 76 to 56 cases (a reduction of 26.3%), with a statistically significant difference between the groups ($p = 0.003$). After 40 days, Group 1 had 56 patients with Kidney Yin deficiency remaining (a reduction of 26.3%), while Group 2 had only 20 patients remaining (a reduction of 73.7%), with a highly statistically significant difference ($p < 0.001$). Simultaneously, many symptoms within the nervous excitation, increased catabolic process, and impaired nourishment syndromes improved earlier and more markedly in Group 2, particularly symptoms such as dizziness, insomnia, night heat, and hot palms and soles [3], [4], [13], [20].

These results indicate that the Luc Vi Di Huang preparation, with its functions of nourishing Yin, tonifying the Kidney, regulating Yin–Yang balance, and improving physical constitution, contributed significantly to improving the Kidney Yin deficiency condition and supporting motor recovery when combined with modified acupuncture, exercise therapy, and Bo Duong Hoan Ngu. This is consistent with pharmacological analyses and domestic and international studies on the effectiveness of multimodal and individualized combination therapies in post-stroke rehabilitation [5], [6], [9], [15], [18], [21], [24], [25], [26], [28], [32], [33].

5. CONCLUSIONS

This study was conducted to evaluate the supportive effects of the Luc Vi preparation in improving motor functional recovery and the Kidney Yin deficiency condition within a combined treatment protocol consisting of modified acupuncture, physical therapy exercises, and the Bo Duong Hoan Ngu preparation in patients with post-stroke hemiplegia after 3 months. Based on analysis of results from 152 participating patients, the following main conclusions can be drawn:

The combined protocol of modified acupuncture, physical therapy exercises, and the Bo Duong Hoan Ngu preparation demonstrated clear effectiveness in improving motor function in patients with post-stroke hemiplegia. The Barthel Index, upper limb motor ability (dexterity test), and lower limb motor ability (10-meter walking time) all showed statistically significant improvement after treatment in both study groups.

Supplementation with the Luc Vi preparation enhanced the effectiveness of motor functional recovery. Patients receiving additional Luc Vi showed faster and more pronounced improvements in the Barthel Index, upper limb motor ability, and lower limb motor ability compared with those not receiving Luc Vi, particularly from the second treatment course onward, with statistically significant differences at the end of treatment.

The Luc Vi preparation demonstrated clear effectiveness in improving the Kidney Yin deficiency condition in patients with post-stroke hemiplegia. The treatment group receiving Luc Vi showed earlier, stronger, and broader symptom improvement across all three syndromes-nervous excitation, increased catabolic process, and impaired nourishment. The proportion of patients remaining with Kidney Yin deficiency after 40 days of treatment was markedly lower in this group compared with the control group.

This study provides clinical evidence that integrating the Luc Vi preparation into a treatment protocol combining modified acupuncture, physical therapy, and Bo Duong Hoan Ngu not only improves the Kidney Yin deficiency condition but also actively supports motor functional recovery in patients with post-stroke hemiplegia after 3 months. The findings further affirm the value of an integrative treatment model combining traditional medicine and modern medicine in post-stroke rehabilitation.

Based on the study results, the following recommendations are proposed:

In clinical practice, consideration should be given to applying a combined treatment protocol of modified acupuncture, physical therapy exercises, Bo Duong Hoan Ngu, and the Luc Vi preparation for patients with post-stroke hemiplegia beyond 3 months, particularly those presenting with Kidney Yin deficiency according to traditional medicine.

Greater emphasis should be placed on assessment and classification of patients according to traditional medicine syndromes, thereby individualizing treatment protocols to optimize functional recovery and overall health status.

Healthcare and rehabilitation facilities should strengthen the implementation of multimodal treatment models that systematically integrate modern medicine with traditional medicine, based on scientific evidence, to improve treatment quality and reduce post-stroke disability burden.

Despite achieving noteworthy results, this study has certain limitations. The follow-up period was relatively short, limited to 40 days of treatment, and thus long-term effectiveness and sustainability of the protocol could not be evaluated. The open-label study design without blinding does not entirely eliminate potential bias. In addition, the study focused exclusively on patients with the Kidney Yin deficiency pattern and did not extend to other traditional medicine patterns commonly observed after stroke.

Future studies should involve longer follow-up periods to evaluate long-term effectiveness and maintenance of functional recovery. Randomized controlled trials with blinding should be designed to enhance result reliability. Subsequent studies may expand participant populations to include other traditional medicine patterns after stroke and further assess quality of life, social reintegration, and cost-effectiveness of the treatment protocol. Integration of advanced assessment methods such as functional imaging or biological markers is also a promising direction to further elucidate the mechanisms of action of the Luc Vi preparation in post-stroke recovery.

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