

The Effect of Acupuncture Therapy with a Combination of *Bu Yang Huan Wu Tang* Formula Modifications on the Recovery of Muscle Strength in *Stroke Patients with Qi Deficiency Syndrome* in Jakarta

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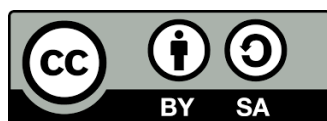
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Abstract

Stroke causes muscle weakness and dependence in daily activities, creating a need for complementary rehabilitation approaches. This study aimed to compare the effects of acupuncture alone and acupuncture combined with a modified herbal formulation of Bu Yang Huan Wu Tang on muscle strength and functional independence among stroke patients with Qi deficiency syndrome in Jakarta. A quasi-experimental pretest–posttest design with a control group was applied to 30 ischemic stroke patients selected through accidental sampling and allocated into two groups of 15 participants. Group A received electroacupuncture, whereas Group B received electroacupuncture combined with modified Bu Yang Huan Wu Tang capsules for seven sessions. Muscle strength and functional independence were assessed during the first, fourth, and seventh sessions using Manual Muscle Testing (MMT) and the Barthel Index, respectively. Data were analyzed using the Friedman and Mann–Whitney tests. Both interventions significantly improved muscle strength and functional independence over time. However, Group B demonstrated greater improvements than Group A in muscle strength (mean rank = 19.67 vs. 11.33; $p = 0.006$) and functional independence (mean rank = 19.40 vs. 11.60; $p = 0.014$). These findings indicate that combining acupuncture with modified Bu Yang Huan Wu Tang was more effective than acupuncture alone in improving post-stroke muscle strength and functional independence.



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INTRODUCTION

Stroke is a clinical syndrome characterized by rapidly developing focal or global cerebral dysfunction lasting 24 hours or longer and potentially resulting in disability or death due to spontaneous hemorrhage or inadequate blood supply to brain tissue. According to the World Health Organization (WHO), stroke is characterized by rapidly developing focal or global neurological deficits that persist for more than 24 hours or result in death, with no apparent cause other than a vascular origin (Alharbi et al., 2019). Broadly, stroke is categorized as hemorrhagic stroke (10–20% of cases) or ischemic stroke (80–90% of cases) (Majumder, 2024). Ischemic stroke occurs more frequently and is primarily caused by thrombotic or embolic events (Budianto et al., 2021).

The prevalence of stroke in Indonesia increased from 7% in 2013 to 10.9% in 2018 (Risesdas, 2018), with Indonesia reported to have a substantial burden of stroke (Bustan et al., 2025). The incidence of stroke increases sharply after the age of 45 years, reaching its highest proportion among individuals aged 55–64 years (33.3%), and is distributed almost equally

between men (50.1%) and women (49.9%) (Wahab & Sijid, 2021). Patient-visit data from the Griya Sehat General Acupuncture Foundation indicated that stroke-related therapy accounted for 28.49% of all visits between October and December 2025, ranking second among the 10 most frequently treated conditions at the clinic.

The most common consequences of stroke include hemiplegia and hemiparesis (Harjpal & Kovala, 2026; İlhanlı et al., 2023; Oscar et al., 2023; Shen et al., 2023). Approximately 80% of stroke patients experience weakness or paralysis on one side of the body (Basuki, 2018), while only 20% of patients with hemorrhagic stroke are reportedly able to regain functional independence (Darotin et al., 2017). Patients with hemiplegia or hemiparesis may require assistance from others, particularly family members, to perform activities of daily living. Improving motor function through rehabilitation may therefore contribute not only to patients' functional status and quality of life but also to reducing the caregiving burden on their families.

In Traditional Chinese Medicine (TCM), stroke is known as *Zhongfeng* (中风), referring to its sudden onset and diverse clinical manifestations traditionally associated with the characteristics of wind (Zhou et al., 2008). One syndrome pattern identified during the recovery stage is *Qi Xu Xue Yu Zheng* (气虚血瘀证), or Qi deficiency and blood stasis syndrome, which may manifest as weakness of the limbs, a pale or sallow complexion, a slightly purple or spotted tongue, a thin white tongue coating, and a fine or weak pulse. Within the TCM framework, the therapeutic principle for this syndrome generally involves tonifying Qi, promoting blood circulation, removing blood stasis, and restoring the flow of the meridians.

Research has indicated that acupuncture after ischemic stroke may exert neuroprotective and neuroregenerative effects by improving cerebral blood flow, regulating oxidative stress, maintaining blood–brain barrier integrity, inhibiting apoptosis, and promoting growth-factor production (Li et al., 2022). Acupuncture has also been associated with improvements in activities of daily living and motor function when used alongside conventional treatment (Tian et al., 2023). In addition, the traditional *Bu Yang Huan Wu Tang* (BYHWT) formula, consisting of Huang Qi, Dang Gui, Chi Shao, Chuan Xiong, Hong Hua, Tao Ren, and Di Long, has been investigated for its potential effects on pathological pathways associated with stroke, including oxidative stress, inflammation, apoptosis, cerebral infarction, and neurological impairment following ischemia–reperfusion injury (Chen et al., 2020). A literature review covering seven databases (CNKI, VIP, SinoMed, Wanfang, PubMed, Cochrane Central, and EMBASE) also suggested that BYHWT combined with acupuncture may improve clinical outcomes among patients with stroke sequelae (Meng et al., 2021).

Because the original BYHWT preparation contains *Di Long* (*Pheretima aspergillum*), which, according to the conditions described in this study, was unavailable for use under applicable Indonesian regulatory requirements, the present study employed a modified BYHWT preparation consisting entirely of plant-derived ingredients without *Di Long*. Given the number of stroke patients receiving treatment at the Griya Sehat General Acupuncture Foundation, this study sought to compare muscle strength and functional independence between patients receiving acupuncture alone and those receiving acupuncture combined with a modified *Bu Yang Huan Wu Tang* formula among stroke patients with Qi deficiency syndrome in Jakarta.

Post-stroke motor recovery requires repetitive, structured, and patient-centered rehabilitation to stimulate neuroplasticity and improve functional performance. Conventional rehabilitation commonly includes physical therapy, occupational therapy, therapeutic exercise, pharmacological management, and control of vascular risk factors. However, recovery outcomes vary according to stroke severity, lesion location, time since onset, comorbidities, treatment adherence, and access to rehabilitation services. Consequently, some patients seek complementary interventions, including acupuncture and traditional herbal medicine, to support improvements in muscle strength and functional independence. In Traditional Chinese Medicine, stroke is described as *Zhongfeng*, while post-stroke weakness accompanied by weakness of the limbs, a pale or sallow complexion, a slightly purple or spotted tongue, a thin white coating, and a fine or weak pulse may be categorized as Qi deficiency and blood stasis syndrome. Treatment for this syndrome generally aims to tonify Qi, promote blood circulation, remove blood stasis, and restore meridian function.

Acupuncture has been investigated as an adjunctive intervention for ischemic stroke rehabilitation because stimulation at selected acupoints may influence cerebral perfusion, neural plasticity, inflammatory responses, oxidative stress, and motor-network reorganization. Li et al. (2022), in a randomized controlled trial published in *Frontiers in Neurology*, found that acupuncture combined with conventional treatment improved neurological and functional outcomes among patients undergoing ischemic stroke rehabilitation. Their findings indicated that acupuncture may support the recovery of motor function and activities of daily living, although its effects should be interpreted in relation to treatment protocols and patient characteristics (Li et al., 2022). Tian et al. (2023) also reported, through a systematic review and meta-analysis, that acupuncture showed potential benefits for motor impairment and activities of daily living among patients with post-stroke spastic paralysis. Nevertheless, variations in acupoint selection, treatment frequency, intervention duration, control procedures, and methodological quality continue to limit the certainty and generalizability of the available evidence.

Traditional herbal therapy has also been investigated as a complementary approach to post-stroke rehabilitation. *Bu Yang Huan Wu Tang* (BYHWT), traditionally composed of Huang Qi, Dang Gui, Chi Shao, Chuan Xiong, Hong Hua, Tao Ren, and Di Long, is commonly used within TCM for conditions interpreted as Qi deficiency accompanied by blood stasis. Experimental evidence suggests that BYHWT may act through multiple pathways associated with cerebral ischemia, including the regulation of inflammation, oxidative stress, neuronal apoptosis, microcirculation, and neurovascular protection. Chen et al. (2020) demonstrated that a powdered BYHWT preparation exerted anti-inflammatory and neuroprotective effects in transient focal cerebral ischemia. However, mechanistic findings from experimental studies cannot be directly equated with clinical effectiveness; therefore, controlled human studies using clearly standardized preparations and clinically relevant outcomes remain essential.

Several previous studies have examined acupuncture or BYHWT in stroke rehabilitation, but fewer have evaluated their combined effects. Meng et al. (2021) conducted a meta-analysis of randomized controlled trials and concluded that BYHWT combined with acupuncture could improve clinical outcomes among patients with stroke sequelae. The analysis provided preliminary support for an integrative treatment strategy in which acupuncture and herbal

therapy may provide complementary therapeutic effects. Nevertheless, the included studies differed in formula composition, acupuncture protocols, treatment duration, outcome measures, and methodological quality. Much of the available evidence was also generated in China, creating uncertainty regarding its applicability to Indonesian patients, local clinical practices, regulatory conditions, and herbal-product availability. Consequently, evidence from an Indonesian clinical setting is needed to assess the applicability of this intervention within the local context.

An additional consideration concerns the composition of the original BYHWT formula, which includes Di Long (*Pheretima aspergillum*). Under the conditions described in the present study, this animal-derived ingredient was unavailable for use because it did not meet the applicable requirements of the Indonesian Food and Drug Authority (BPOM). The formula was therefore modified into an entirely plant-derived preparation containing ingredients intended to retain the TCM therapeutic principles of tonifying Qi, promoting blood circulation, and removing blood stasis. However, removing Di Long and incorporating other plant-derived ingredients results in a modified formulation; therefore, findings concerning the classical BYHWT formula cannot automatically be extrapolated to this preparation. Furthermore, limited empirical evidence is available regarding whether acupuncture combined with this modified plant-based formula produces greater improvements in muscle strength and functional independence than acupuncture alone among Indonesian stroke patients with Qi deficiency syndrome.

This evidence gap establishes the rationale and novelty of the present study. Previous investigations have generally focused on acupuncture as an adjunctive therapy, the classical BYHWT formula, or combinations retaining the original herbal composition. In contrast, this study compared acupuncture alone with acupuncture combined with a plant-based modification of BYHWT among stroke patients specifically diagnosed with Qi deficiency syndrome in Jakarta. Outcomes were evaluated at three measurement points—before treatment, after the fourth session, and after the seventh session—using Manual Muscle Testing (MMT) and the Barthel Index. The simultaneous evaluation of muscle strength and functional independence was important because improvements in muscle strength do not necessarily translate directly into greater independence in activities of daily living. This design therefore provided clinical information regarding both motor recovery and its functional implications.

Accordingly, this study aimed to determine changes in muscle strength and functional independence among stroke patients with Qi deficiency syndrome receiving acupuncture alone, assess corresponding changes among patients receiving acupuncture combined with the modified BYHWT formula, and compare the magnitude of improvement between the two groups. The study was expected to contribute empirical evidence regarding the clinical application of an adapted, plant-based BYHWT preparation within an Indonesian acupuncture setting. The findings may assist practitioners in treatment planning, provide patients and families with information regarding the potential functional benefits of the combined intervention, and offer preliminary evidence for future larger randomized controlled trials. More broadly, the study may contribute to the development of culturally relevant, measurable, and evidence-informed complementary rehabilitation approaches while emphasizing that these

interventions should complement, rather than replace, standard medical care and multidisciplinary stroke rehabilitation.

METHOD

This study employed a quasi-experimental design with a pretest–posttest control group design to examine the causal effects of the intervention. The research was conducted at Griya Sehat of the General Acupuncture Foundation, Jakarta, from July 17 to August 15, 2026.

The study population consisted of stroke patients who visited the General Acupuncture Foundation in Jakarta during the study period. The sample included 30 stroke patients with Qi deficiency syndrome selected using an accidental sampling technique (Ishak et al., 2023). The inclusion criteria were patients diagnosed with ischemic stroke, aged 40–70 years, with a disease duration of less than one year, and muscle strength scores ranging from 1 to 4. The exclusion criteria were patients with hemorrhagic stroke, aged below 40 or above 70 years, disease duration exceeding one year, and muscle strength scores of 0 or 5. The participants were divided into two groups of 15 individuals each: Group A received acupuncture therapy, while Group B received a combination of acupuncture therapy and modified Bu Yang Huan Wu Tang (BYHWT) formula.

The independent variables were acupuncture therapy and the modified BYHWT formula, while the dependent variables were changes in muscle strength measured using the Manual Muscle Test (MMT) scale and functional independence assessed using the Barthel Index. The operational definitions of the research variables are presented in Table 1.

Table 1. Operational Definition of Research Variables

Yes	Variable	Definition	Indicator	Measuring Instruments	Data Scale
1	Acupuncture (Independent)	Acupuncture PTT method	Main acupuncture points: <i>Shui Gou, Nei Guan, Feng Chi, Bai Hui, Qu Chi, Wei Zhong, San Yin Jiao, He Gu, Feng Long, Tai Chong, Tai Xi, Zu San Li, Yang Ling Quan, Yin Ling Quan</i>	Patient Data Sheet	Nominal
2	Formula (Independent)	Formula PTT	Bu Yang Huan Wu Tang <i>formula modification</i> with 16 herbal compositions (Table 4)	Patient Data Sheet	Nominal
3	Independence (Dependent)	<i>Barthel Index</i>	0–4: total dependence; 5–8: heavy dependence; 9–11: moderate dependence; 12–19: mild dependence; 20: independent	Barthel Index Scale	Ordinal
4	Muscle Strength (Dependent)	<i>Manual Muscle Test (MMT)</i>	0: total paralysis; 1: contraction without movement; 2: movement without resistance to gravity; 3: against gravity; 4: against gravity and little resistance; 5: full force	MMT Scale	Ordinal

Source: Secondary Data 2026, Reprocessed

The conceptual framework of this study explains the flow of thought starting from the risk factors *for stroke* according to conventional medicine and etiology according to PTT, to the therapeutic evaluation process in both treatment groups, as presented in Table 2.

Table 2. Research Concept Framework

Stages	Description
Risk factors/etiology	Conventional medicine: hypertension, diabetes, coronary heart disease, alcohol, high cholesterol, smoking, obesity, blood clotting disorders, stress, lack of activity, advanced age, genetics. PTT: accumulation of deep wounds, overwork, improper diet, emotional injury, as well as <i>Qi deficiency</i> and pathogen attacks.
Clinical conditions	Stroke patients <i>with Qi deficiency syndrome</i> (early bound variable)
Independent variables	Group A: single acupuncture therapy. Group B: combination of acupuncture therapy and <i>formula modification Bu Yang Huan Wu Tang</i>
Bound variables	Changes in muscle strength (MMT scale) and independence (<i>Barthel Index</i>) in <i>stroke patients</i>
Evaluation	Comparison of MMT and <i>Barthel Index</i> scales between the two groups in the 1st, 4th, and 7th therapy

Source: Secondary Data 2026, reprocessed (simplified from the research conceptual framework and conceptual framework)

After the *diagnosis of stroke of Qi deficiency syndrome* was established, patients were divided into two groups. Group A received acupuncture therapy for 20 minutes per session, twice a week for 7 meetings (± 21 days) using a stimulator (electroacupuncture), with acupuncture points as presented in Table 3.

Table 3. Acupuncture Points and Therapeutic Function

Dot	Therapeutic Function
<i>Bai Hui</i> 百会	Calming <i>Shen</i> and Wind, opening the five senses
<i>Feng Chi</i> 风池	Repel Wind Pathogens
<i>Shui Gou</i> 水沟	Re-energizing consciousness, eliminating external winds
<i>Qu Chi</i> 曲池	Expelling Wind, draining Moisture, cleaning Heat, treating paralysis of upper locomotion
<i>Nei Guan</i> 内关	Soothing <i>Shen</i> , releasing the bonds in the chest, opening the meridians
<i>He Gu</i> 合谷	Liberate the Exterior, set the <i>defense Qi</i> , open the channel
<i>Wei Zhong</i> 委中	Cleans heat, cools blood, reduces pain
<i>Yang Ling Quan</i> 阳陵泉	Cleans Hot Moisture from the Liver and Gallbladder, strengthens tendons
<i>Yin Ling Quan</i> 阴陵泉	Repelling moisture
<i>Zu San Li</i> 足三里	Restores appetite, copes with epigastric pain
<i>Feng Long</i> 丰隆	Eliminates phlegm, strengthens the legs
<i>San Yin Jiao</i> 三阴交	Nourishes the liver, spleen, and kidneys, strengthens the legs
<i>Tai Xi</i> 太溪	Maintain <i>Kidney Yin</i> , cleanse Deficient Heat, stabilize <i>Kidney Qi</i>
<i>Tai Chong</i> 太冲	Relieves liver wind, treats <i>stroke</i>

Source: Focks (2008), reprocessed

Group B received the same acupuncture protocol as Group A, combined with a modified *formula of Bu Yang Huan Wu Tang* 补阳还五汤 which was taken daily, three times a day after meals (4 capsules each drink) for approximately 21 days (7 times of therapy). This formula is used in the form of capsule preparations that are entirely of plant origin, with the composition as presented in Table 4.

Table 4. Composition of *Bu Yang Huan Wu Tang Formula Modification*

Name	Dosage/Capsule	Dose/One Drink	Dosage/Day (3×4 capsules)
<i>Huang Qi</i> 黄耆 (<i>Astragal Membranaceus Radix</i>)	132 mg	528 mg	1.584 mg
<i>Chi Shao</i> 赤芍 (<i>Rubra Radix Pioneer</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Dan Shen</i> 丹参 (<i>Salviae Miltiorrhizae Radix</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Dang Gui</i> 当归 (<i>Angelica Sinensis Radix</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Chuan Xiong</i> 川芎 (<i>Ligustici Chuanxiong Rhizoma</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Tao Ren</i> 桃仁 (<i>Prunus persicae Semen</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Hong Hua</i> 红花 (<i>Carthami tinctorius flos</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Ru Xiang</i> 乳香 (<i>Boswellia Carterii</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Mo Yao</i> 没药 (<i>Commiphora Myrrha</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Ji Xue Teng</i> 鸡血藤 (<i>Spatholobus suberectus caulis</i>)	17.7 mg	70.8 mg	212.4 mg
<i>New Xi</i> 牛膝 (<i>Achyranthis bidentatae radix</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Gui Zhi</i> 桂枝 (<i>Cinnamomi Cassiae ramulus</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Sang Zhi</i> 桑枝 (<i>Morus Alba Ramulus</i>)	17.7 mg	70.8 mg	212.4 mg
<i>Bei Mu</i> 贝母 (<i>Fritillariae thunbergii bulbus</i>)	13.2 mg	52.8 mg	158.4 mg
<i>Di Huang</i> 地黄 (<i>Rehmanniae glutinosae Radix</i>)	13.2 mg	52.8 mg	158.4 mg
<i>Jiang Huang</i> 姜黄 (<i>Curcumae Aromatica Radix</i>)	29.2 mg	116.8 mg	350.4 mg

Source: Secondary Data 2026, Reprocessed

**Figure 1.** *Bu Yang Huan Wu Tang Formula Material* (Source: sohu.com, 2026, in original manuscript)

The data collected included anamnesis (name, age, sex, main complaints, disease history), PTT inspection, palpation, and examination of the MMT scale and *Barthel Index* before therapy, after the fourth therapy, and after the seventh therapy. The *Barthel Index instrument* measured basic functional status through 10 activities with a total score of 0–20 (Table 5), while the MMT scale measured muscle strength in the range of 0–5 (Table 6).

Table 5. Barthel Index Assessment Instrument

Yes	Rated Activities	Maximum Score	Ability Categories
1	Transfer (sleep to sit)	3	Independent (3); assisted by 1 person (2); assisted by 2 people (1); unable (0)
2	Walking (mobilization)	3	Independent (3); assisted by 1 person (2); assisted by 2 people (1); unable (0)
3	Use of toilets	2	Independent (2); need help (1); dependent on others (0)
4	Cleaning yourself (face wipe, comb, toothbrush)	1	Independent (1); need help (0)
5	Bowel Control	2	Regular continent (2); sometimes incontinent (1); incontinent (0)
6	BAK Control	2	Independent (2); sometimes incontinent (1); incontinent (0)
7	Shower	1	Independent (1); dependent on others (0)
8	Dress up	2	Independent (2); partially assisted (1); dependent on others (0)
9	Eating	2	Independent (2); need help (1); dependent on others (0)
10	Up and down the stairs	2	Independent (2); need help (1); incapable (0)

Source: Rakhmawati (2017). Total score 0–20: 0–4 = total dependence; 5–8 = heavy dependence; 9–11 = moderate dependence; 12–19 = mild dependence; 20 = independent

Table 6. Manual Muscle Testing Scale (MMT)

Scale	Characteristics
0	Completely paralyzed, no strength at all
1	There is a slight contraction of the muscles, but no movement is obtained by the muscles
2	Motion is obtained, but it is not able to resist gravity
3	Can make movements against gravity
4	Can resist heavy forces (gravity) and cope with little resistance given
5	Full strength, no paralysis

Source: Daeli et al. (2018)

The quantitative data were analyzed using statistical methods. The Shapiro–Wilk normality test was conducted to determine whether parametric or non-parametric statistical tests should be applied. Since the data were not entirely normally distributed, comparisons of the MMT and Barthel Index scores across the three measurement periods (first, fourth, and seventh therapy sessions) within each group were performed using the Friedman test. Differences in the magnitude of changes between Group A and Group B were analyzed using the Mann–Whitney U test, with a significance level of $p < 0.05$.

This study complied with ethical principles for health research involving human participants. Before the intervention, all respondents provided written informed consent. The principles of non-maleficence and beneficence guided the research procedures (Saraspuri et al., 2025). The study also adhered to principles of honesty, objectivity, integrity, confidentiality of respondent data, respect for intellectual property rights, protection of human subjects, non-discrimination, and responsible scientific publication in accordance with the research and publication guidelines of Medika Suherman University in 2026.

RESULTS AND DISCUSSION

The study, which was conducted on July 17–August 15, 2026, involved 30 *stroke patients with Qi deficiency syndrome*, characterized by symptoms of weak limbs without power, withered yellow faces, slightly purple tongue or spots, thin white tongue membranes, and weak or weak fine veins. Subjects were divided into Group A (acupuncture, n=15) and Group B (combination of acupuncture and modification of the BYHWT formula, n=15). Data collection of MMT and *Barthel Index scale data* was carried out three times, namely before the first therapy, after the fourth therapy, and after the seventh therapy.

The gender, age, and occupation profiles of respondents in both groups are presented in Table 7. In Group A, most of the respondents were male (60.0%), aged > 55–65 years old (60.0%), and working as housewives, employees, or self-employed (26.7% each). In Group B, most of the respondents were also male (73.3%), aged > 55–65 years old (80.0%), and employed as self-employed (53.3%).

Table 7. Respondent Profile

Profile	Group A (n=15)n	Group A (n=15)%	Group B (n=15)n	Group B (n=15)%
Gender				
Male	9	60,0	11	73,3
Women	6	40,0	4	26,7
Age				
< 55 years old	3	20,0	0	0,0
> 55–65 years old	9	60,0	12	80,0
> 65 years old	3	20,0	3	20,0
Jobs				
Housewives	4	26,7	4	26,7
Employees	4	26,7	0	0,0
Self-employed	4	26,7	8	53,3
PNS	1	6,7	0	0,0
Retirees	2	13,3	3	20,0

Source: Primary Data 2026, Reprocessed

The condition of the respondents' muscle strength in all three therapy periods is presented in Table 8. The average score of muscle strength in Group A increased from 2.67 (therapy 1) to 3.20 (therapy 4) and 3.40 (therapy 7). In Group B, the average score increased from 2.20 (therapy 1) to 3.33 (therapy 4) and 3.87 (therapy 7), indicating a greater improvement than in Group A.

Table 8. Condition of Respondents' Muscle Strength in Both Groups

Score	A: T1	A: T4	A: T7	B: T1	B: T4	B: T7
1	2 (13,3%)	2 (13,3%)	1 (6,7%)	2 (13,3%)	1 (6,7%)	-
2	6 (40,0%)	2 (13,3%)	3 (20,0%)	9 (60,0%)	2 (13,3%)	3 (20,0%)
3	2 (13,3%)	4 (26,7%)	2 (13,3%)	3 (20,0%)	5 (33,3%)	2 (13,3%)
4	5 (33,3%)	5 (33,3%)	7 (46,7%)	1 (6,7%)	5 (33,3%)	4 (26,7%)
5	-	2 (13,3%)	2 (13,3%)	-	2 (13,3%)	6 (40,0%)
Total	15 (100%)	15 (100%)	15 (100%)	15 (100%)	15 (100%)	15 (100%)

Score	A: T1	A: T4	A: T7	B: T1	B: T4	B: T7
Red	2,67	3,20	3,40	2,20	3,33	3,87

Source: Primary Data 2026, reprocessed. A = Acupuncture Group; B = Acupuncture and Formula Combination Group; T1/T4/T7 = 1/4/7th therapy

The patient's condition of independence (*Barthel Index*) in the three therapy periods is presented in Table 9. The average score of the *Barthel Index* in Group A increased from 12.60 (therapy 1) to 14.27 (therapy 4) and 14.87 (therapy 7). In Group B, the average score increased from 11.53 (therapy 1) to 14.20 (therapy 4) and 16.53 (therapy 7), which also showed a greater improvement than in Group A.

Table 9. Patient Independence Condition (*Barthel Index*) in Both Groups

Scale	A: T1	A: T4	A: T7	B: T1	B: T4	B: T7
0-4	2 (13,3%)	1 (6,7%)	-	-	-	-
5-8	-	1 (6,7%)	2 (13,3%)	3 (20,0%)	3 (20,0%)	2 (13,3%)
9-11	3 (20,0%)	-	-	6 (40,0%)	1 (6,7%)	1 (6,7%)
12-19	10 (66,7%)	11 (73,3%)	11 (73,3%)	6 (40,0%)	10 (66,7%)	7 (46,7%)
20	-	2 (13,3%)	2 (13,3%)	-	1 (6,7%)	5 (33,3%)
Total	15 (100%)	15 (100%)	15 (100%)	15 (100%)	15 (100%)	15 (100%)
Red	12,60	14,27	14,87	11,53	14,20	16,53

Source: Primary Data 2026, reprocessed. A = Acupuncture Group; B = Acupuncture and Formula Combination Group; T1/T4/T7 = 1/4/7th therapy

The results of the Shapiro-Wilk *normality test* in both groups are presented in Table 10. In Group A, the muscle strength data were not normally distributed (Therapeutic Sig. 1 = 0.012; Therapy 7 = 0.045 < 0.05), as well as independence data (Therapeutic Sig. 4 = 0.026 < 0.05). In Group B, the muscle strength data were also not normally distributed (Therapeutic Sig. 1 = 0.010; Therapy 7 = 0.006 < 0.05), as well as independence data (Therapeutic Sig. 7 = 0.001 < 0.05). Since some of the data were not normally distributed, the next test used non-parametric statistics.

Table 10. Results of Data Normality Test in Both Groups (*Shapiro-Wilk*)

Groups	Period	MMT: Statistic	MMT: Df	MMT: Sig.	BI: Statistic	BI: Df	BI: Sig.
A	Therapy 1	0,839	15	0,012	0,904	15	0,109
A	Therapy 4	0,914	15	0,155	0,862	15	0,026
A	Therapy 7	0,879	15	0,045	0,903	15	0,105
B	Therapy 1	0,832	15	0,010	0,939	15	0,365
B	Therapy 4	0,926	15	0,235	0,899	15	0,093
B	Therapy 7	0,819	15	0,006	0,739	15	0,001

Source: Primary Data 2026, reprocessed. MMT = Manual Muscle Test; BI = Barthel Index

The results of the *Friedman test* to compare muscle strength and independence between three time periods in each group are presented in Table 11. In Group A, the *mean rank* of the MMT scale increased from 1.47 (therapy 1) to 2.13 (therapy 4) and 2.40 (therapy 7) with $p = 0.001 < 0.05$, while the *mean rank* of the *Barthel Index* increased from 1.23 to 2.20 and 2.57

with $p = 0.000 < 0.05$. In Group B, the *mean rank* of the MMT scale increased from 1.10 to 2.20 and 2.70 with $p = 0.000 < 0.05$, while the *mean rank of the Barthel Index* increased from 1.03 to 2.10 and 2.87 with $p = 0.000 < 0.05$. These results show that both single acupuncture therapy and a combination of acupuncture and formula significantly improve the patient's muscle strength and independence as the number of therapy sessions increases.

Table 11. Results of the *Friedman Test* (Inter-Time Comparison) in Both Groups

Groups	Variable	Mean Rank T1	Mean Rank T4	Red Rank T7	Chi-Square	p-value
A	MMT	1,47	2,13	2,40	14,857	0,001
A	<i>Barthel Index</i>	1,23	2,20	2,57	21,350	0,000
B	MMT	1,10	2,20	2,70	25,125	0,000
B	<i>Barthel Index</i>	1,03	2,10	2,87	27,745	0,000

Source: Primary Data 2026, reprocessed. A = Acupuncture Group; B = Acupuncture and Formula Combination Group; T1/T4/T7 = 1/4/7th therapy

The comparison of the magnitude of changes in the MMT scale and *the Barthel Index* between Group A and Group B was tested by the *Mann-Whitney test* and presented in Table 12. In the MMT variable, the *mean rank* of Group B (19.67) was higher than that of Group A (11.33), with $U = 50,000$; $Z = -2.743$; $p = 0.006$ (*Exact p* = 0.009), showing a statistically significant difference. In the *Barthel Index* variable, the *mean rank* of Group B (19.40) was also higher than Group A (11.60), with $U = 54,000$; $Z = -2.455$; $p = 0.014$ (*Exact p* = 0.015), which also showed a significant difference. These two results showed that Group B experienced a better change/improvement in the MMT scale and *Barthel Index* compared to Group A.

Table 12. Results of the *Mann-Whitney Test* (Inter-Group Comparison)

Variable	Groups	N	Mean Rank	U	Z	p-value	Exact p
MMT	A	15	11,33	50,000	-2,743	0,006	0,009
MMT	B	15	19,67				
<i>Barthel Index</i>	A	15	11,60	54,000	-2,455	0,014	0,015
<i>Barthel Index</i>	B	15	19,40				

Source: Primary Data 2026, Reprocessed

A summary of the results of the combined comparative test in both groups is presented in Table 13. Both based on the MMT scale and *the Barthel Index*, Group B had a higher *mean rank* and significant difference ($p < 0.05$) than Group A, so that overall the combination of acupuncture and modification of the BYHWT formula (Group B) showed better results than single acupuncture (Group A).

Table 13. Summary of Results of Combined Comparative Tests in Both Groups

Variable	Mean Rank A	Mean Rank B	p-value	Conclusion
MMT	11,33	19,67	0,006	B is significantly better
<i>Barthel Index</i>	11,60	19,40	0,014	B is significantly better

Source: Primary Data 2026, Reprocessed

This study aimed to answer three main questions: to observe the muscle strength and independence of acupuncture-treated stroke patients; to observe the muscle strength and independence of acupuncture-treated stroke patients combined with modifications of the BYHWT formula; and to analyze the comparison of results between the two. In acupuncture therapy, the increase in the mean rank of the MMT scale from 1.47 to 2.40 ($p = 0.001$) and the mean rank of the Barthel Index from 1.23 to 2.57 ($p = 0.000$) showed that acupuncture significantly improved muscle strength and patient independence. In the combination of acupuncture and formula, the increase in the mean rank of the MMT scale from 1.10 to 2.70 and the mean rank of the Barthel Index from 1.03 to 2.87 (both $p = 0.000$) showed a similar pattern of increase but with a higher magnitude.

To compare the magnitude of the changes between the two groups, the 7th therapy data was subtracted by the 1st therapy data in each participant, considering that the initial condition of each participant was different so that it could not be compared based only on the condition in the 7th therapy alone. The results of the Mann-Whitney test showed that the mean rank of Group B was higher than that of Group A, both on the MMT scale (19.67 versus 11.33; $p = 0.006$) and the Barthel Index (19.40 versus 11.60; $p = 0.014$), which means that Group B experienced better improvement in muscle strength and independence than Group A. Thus, although both groups showed positive results in muscle strength and independence recovery, the combination of acupuncture and modification of the BYHWT formula (Group B) gave better results than single acupuncture (Group A).

These findings are in line with a literature review conducted by Meng *et al.* (2021) of a randomized controlled trial examining the combined effects of BYHWT formula and acupuncture on stroke sequelae, concluding that the combination is an effective therapy to improve clinical symptoms due to residual stroke symptoms. Neuroprotective and neuroregenerative effects of acupuncture (Li *et al.*, 2022) which works in tandem with the anti-inflammatory and protective effects of the BYHWT formula against cerebral ischemia (Chen *et al.*, 2020) is thought to be the mechanistic basis for better outcomes in the combination group.

This study has several limitations. First, sampling was only carried out at one location (General Acupuncture Foundation, Jakarta) so that the sample variation was limited, and the researcher had limitations in controlling the patient's daily life. Second, as an outpatient, disturbing factors such as diet, lifestyle, and emotional state of the patient could not be fully controlled by the researcher, in contrast to inpatients whose diet and environment were more controlled. Third, the relatively short study period (7 times of therapy) also limited the results that could be achieved, especially in patients with very weak body conditions who required longer treatment time to show significant results.

CONCLUSION

Based on the findings regarding the effect of acupuncture therapy combined with a modified Bu Yang Huan Wu Tang (BYHWT) formula on the recovery of muscle strength among stroke patients with Qi deficiency syndrome in Jakarta, it can be concluded that acupuncture therapy alone significantly improved muscle strength ($p = 0.001$) and functional independence ($p < 0.001$). Similarly, the combination of acupuncture and the modified

BYHWT formula significantly improved both muscle strength and functional independence (both $p < 0.001$). However, comparisons between the two groups demonstrated that Group B (combination therapy) achieved significantly greater improvements than Group A (acupuncture alone) in muscle strength measured using Manual Muscle Testing (MMT) (mean rank = 19.67 vs. 11.33; $p = 0.006$) and functional independence measured using the Barthel Index (mean rank = 19.40 vs. 11.60; $p = 0.014$). These findings indicate that acupuncture combined with the modified Bu Yang Huan Wu Tang formula was more effective than acupuncture alone in improving muscle strength and functional independence among stroke patients with Qi deficiency syndrome, although both interventions produced significant improvements. Based on these findings and the limitations of the study, the combined intervention may be considered as a complementary approach within comprehensive post-stroke rehabilitation, alongside standard medical care. Patients should also maintain adherence to prescribed rehabilitation programs and appropriately manage modifiable risk factors that may influence recovery. Future studies should include larger sample sizes, multiple study sites, longer intervention and follow-up periods, and stricter control of potential confounding variables to strengthen the evidence regarding the effectiveness and durability of this combined therapeutic approach.

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