# ประสิทธิผลของโปรแกรมการพยาบาลในการฟื้นฟูสมรรถภาพที่บ้าน สำหรับผู้ป่วยโรคหลอดเลือดสมองตีบต่อการทำหน้าที่ การรับรู้ภาวะสุขภาพ และคุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพ

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**บทคัดย่อ**

การฟื้นฟูสมรรถภาพผู้ป่วยโรคหลอดเลือดสมอง คือการส่งเสริมการทำหน้าที่และพัฒนาคุณภาพชีวิตของผู้ป่วยให้ดีขึ้น จากการทบทวนวรรณกรรมพบว่า โปรแกรมการฟื้นฟูสมรรถภาพผู้ป่วยโรคหลอดเลือดสมองที่บ้านพบว่ามีจำนวนน้อย การวิจัยกึ่งทดลองแบบสองกลุ่มเปรียบเทียบครั้งนี้ กลุ่มตัวอย่าง คือ ผู้ป่วยโรคหลอดเลือดสมองตีบที่จำหน่ายกลับบ้านจากโรงพยาบาลพหลพลพยุหเสนา และอาศัยอยู่ในจังหวัดกาญจนบุรี โดยการสุ่มตัวอย่างแบบง่าย จำนวน 48 ราย ซึ่งได้รับคัดเลือกเข้ากลุ่มทดลองและกลุ่มควบคุม กลุ่มละ 24 ราย กลุ่มทดลองได้รับกิจกรรมการดูแลตามโปรแกรมฯ จำนวน 12 สัปดาห์ แบ่งเป็น 3 ระยะ คือ ระยะที่ 1 ประเมินความต้องการของผู้ป่วยแต่ละรายอย่างครอบคลุมและการวางแผนการฟื้นฟูฯ ระยะที่ 2 การฟื้นฟูสมรรถภาพที่บ้านรายบุคคล ระยะที่ 3 การติดตามดูแลต่อเนื่อง ส่วนกลุ่มควบคุมได้รับการดูแลตามปกติจากบุคลากรทางสุขภาพ เครื่องมือที่ใช้ คือ แบบประเมินกิจวัตรประจำวัน แบบสอบถามการรับรู้ภาวะสุขภาพ และแบบสอบถามคุณภาพชีวิต ผู้วิจัยเก็บรวบรวมข้อมูลจำนวน 4 ครั้ง คือ ก่อนการทดลอง ขณะทดลองในสัปดาห์ที่ 4 และ 8 และหลังการทดลองในสัปดาห์ที่ 12 วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและการวัดความแปรปรวนซ้ำพหุคูณ

หลังการทดลอง 12 สัปดาห์ พบว่า กลุ่มทดลองมีผลลัพธ์ทางสุขภาพโดยรวม (การทำหน้าที่ การรับรู้ภาวะสุขภาพ และคุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพ) สูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ($V = .56$, $F(3.44) = 18.84$, $p < .001$) และพบว่ากลุ่มทดลองมีผลลัพธ์ทางสุขภาพโดยรวมดีกว่ากลุ่มควบคุม เมื่อวัดซ้ำในสัปดาห์ที่ 4, 8 และ 12 ($V = .96$, $F(9.38) = 1.08$, $p < .001$) นอกจากนี้เมื่อทดสอบการมีปฏิสัมพันธ์ระหว่างกลุ่มและเวลาพบว่า กลุ่มทดลองมีผลลัพธ์ทางสุขภาพโดยรวมสูงกว่ากลุ่มควบคุม ($V = .83$, $F(9, 38) = 20.54$, $p < .001$) ผลที่ได้จากการศึกษาครั้งนี้แสดงให้เห็นถึงประโยชน์ของโปรแกรมการพยาบาล ในการฟื้นฟูสมรรถภาพที่บ้านหลังจากจำหน่ายออกจากโรงพยาบาล ซึ่งพยาบาลและบุคลากรด้านสุขภาพสามารถนำไปเป็นแนวทางในการส่งเสริมการดูแลที่บ้านสำหรับผู้ป่วยโรคหลอดเลือดสมองตีบอย่างมีประสิทธิภาพได้

**คำสำคัญ**: การฟื้นฟูสมรรถภาพที่บ้าน การทำหน้าที่ การรับรู้ภาวะสุขภาพ คุณภาพชีวิตที่เกี่ยวข้องกับสุขภาพ โรคหลอดเลือดสมองตีบ

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# Effectiveness of a home-based rehabilitation nursing program on functional status, health perceptions, and quality of life after ischemic stroke

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**Abstract**

Rehabilitation of stroke patients is necessary to enhance their performance and quality of life. Review of the literature found rehabilitation programs for stroke patients at home are limited. For this study a quasi - experimental research design was applied. Participants were ischemic stroke patients discharged from Paholpolpayuhasena Hospital and living in Kanchanaburi province. Forty eight participants were randomly assigned to an intervention group (n = 24) and a control group (n = 24). Participants of the intervention were investigated during 12 weeks in three phases: 1) comprehensive individual need assessment and planning for rehabilitation, 2) individualized home-based rehabilitation, and 3) follow-up continuing care. Patients of the control group received routine care only from health professionals. The assessment-instruments were the Barthel Index, the Thai General Health Questionnaire, and the SF-36. Data were collected four times, at baseline, during intervention at week 4 and 8, and after finishing the intervention at week 12. Data were analyzed by using descriptive statistics and repeated measure MANOVA.

The overall health outcome scores of the intervention group (functional status, health perceptions, and Health Related Quality of Life) were significantly higher than those of the control group ($V = .56$, $F(3.44) = 18.84$, $p < .001$). Multivariate analysis also showed a significant time related effect ($V = .96$, $F(9.38) = 1.08$, $p < .001$). During the investigation period health outcome of the intervention compared to the control group improved ($V = .83$, $F(9, 38) = 20.54$, $p < .001$). Our results indicate the benefits of HRNP intervention for ischemic stroke survivors after discharge. It is therefore recommended that nurses and other health care personnel apply this home based program.

**Keywords**: home-based rehabilitation, functional status, health perception, health-related quality of life, ischemic stroke

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**Background**

Stroke is a major public health concern, especially in developed countries. It is a leading cause of illness and death throughout the world. The World Health Organization states that 15 million people suffer from stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled.[1] In the United States of America, the incidence of new or recurrent stroke is approximately 795,000 people per year. In Thailand, stroke is the third leading cause of both death and disability.[2] The prevalence of new stroke patients in 2010 was 50.56 per 100,000 populations.[3] The Thai Stroke Society reported that management of stroke costs 29,571 Thai baht per person, or 2,973 million Thai baht per year (100 million USD). In Thailand the estimated cost for stroke management based on 0.5 million patients is at least 20,632 million Thai baht per year.[4] Many hospitals in Thailand face a shortage of health professionals and other resources. Stroke survivors need long-term care, but stroke rehabilitation services are rarely available in secondary and primary hospitals. In-patient rehabilitation units are also not widely available. Rehabilitation in Thailand is still below the national target.[5] Reviews showed that the existing healthcare system for stroke management in Thailand focus on hospital-based managing the acute stage and evaluating short-term treatment.[6-7] Thailand healthcare services recognize the challenges and consequences of stroke and have implemented protocols to improve the outcome of these patients. However, large numbers of stroke survivors still suffer from stroke-related morbidity.[8-9] Previous studies showed that at 1 and 9 months after stroke, patients frequently have unsatisfied quality of life (QoL) and poor health related quality of life (HRQoL).[10-11] Other studies have shown that many stroke survivors experience a decline in their HRQoL and require support both psychological and physical to maintain their independence and the best possible QoL.[12]

Therefore, the Home-based Rehabilitation Nursing Program (HRNP) was developed based on the concept of rehabilitation by the Association of Rehabilitation Nurses (ARN),[13] the concept of HRQoL by Wilson and Cleary,[14] and evidence of previous studies.[15-16] Moreover, a study in Thailand also found that home-based services provide significantly better physical and functional abilities for patients who obtained routine care. Other data demonstrate good outcome for interventions that attempt to improve functional status, QoL, and HRQoL.[16-17]

However, based on previous nursing interventions, some results were not significant and remained unchanged in treating depression of stroke survivors. Previous home-based rehabilitation interventions for stroke survivor showed to be effective, convenient, and comfortable regarding patients' privacy, decreased distraction, and being economic.[18-19]

**Objectives**

To test the effectiveness of the Home-based Rehabilitation Nursing Program (HRNP) on HRQoL during a period of 12 weeks.

**Methodology**

A quasi-experimental design with two-group, pre- post test was applied. The intervention group received a 12 –week HRNP, whereas the control group received

usual care. The outcomes in both groups were measured at baseline, week 4, week 8, and week 12.

**Population and sample**

The population of this study comprised of adults who had been diagnosed with ischemic stroke, were living in the Muang district, Kanchanaburi province, and were treated at the Paholpolpayuhasena Hospital in 2015-2016. The samples in this study were ischemic stroke survivors. The inclusion criteria were aged 30-65 years, had first stroke attack and had been discharged within 6 months, had slightly to moderate disability assessed by the MRS (Scores 2-4) and no cognitive impairment (CMT more than 14 scores), and had a caregiver (a family member) that lived with them, assist for rehabilitation, was able to access a telephone, and willingly participated in the study. The exclusion criteria were the subjects had due to serious illness from the stroke or co-morbid disease and could not continue the program.

**Sample size**

The sample size was based on a study of Chalermwannapong, Panuthai, Srisuphan, Panya, and Ostwald[7] that examined the effect of transitional care program on functional ability and quality of life of stoke survivors. The results showed that the mean score of functional ability in the experimental group was 33.77 (SD = 5.02) and in the control group showed the mean score was 27.79 (SD = 9.97). Hence, the criteria of the significant level of .05, power of .80, and effect size of .80 were used; the required 25 persons per group.[20] However, there were only 48 participants matching the criteria. Therefore, 24 participants were assigned into each group.

**Tools**

The instruments for screening were:

1.1 The CMT developed by the Jitapunkul, Lailert, Worrakul, Sriokiatkhachorn, and Brahim was used to screen cognitive level.[21] There are 13 items measuring cognitive function. Responses to the items are coded on a dichotomous scale of 0 (incorrect) and 1 (correct), in which item 5 and item 12 had two-sub scales, and item 3 and item 13 had three sub-scales.

1.2 The MRS was used for measuring the degree of disability or dependence in the daily activities of people who have suffered a stroke. It was originally introduced in 1957 by Dr. John Rankin of Stobhill Hospital Glasgow, Scotland.[22] The scale runs from 0-6, running from perfect health without symptoms to death.

2.1 The Barthel Index (BI) was used to assess the functional status. The BI was developed by the Prasat Neurological Institute of Thailand.[9] The BI has a score ranging from 0 to 100. It can categorize 5 grades. The top score implies full functional independence.

2.2 The Thai general health questionnaire (Thai GHQ-12) used to measure health perceptions, being developed by Goldberg.[23] This study used the Thai GHQ-12 developed by Nilchaikovit, Sukying, and Silpakit.[24] It comprises six items that are positive descriptions of mood states (e.g "felt able to overcome difficulties") and six that are negative (e.g. "felt like a worthless person").

2.3 The SF-36 questionnaire was used to measure HRQoL. It was developed by Leurmarnkul and Meetam.[25] The SF-36 includes 35 item scales and 1 reports health transition to measure in 8 dimensions. The response for

each item is recorded with a value ranging from 0-100. A higher score indicates a better quality of life.

Content validity was evaluated by four experts, i.e. medical physician, stroke-nurse specialist, and 2 nursing instructors who are experts in stroke care and psychological care. The content validity indices (CVI) of BI, GHQ, and SF-36 were .95, 1.00, and 1.00 respectively. Reliability of these instruments were tested using Cronbach's alpha for internal consistency reliability. These questionnaires were piloted with twenty stroke survivors who have similar characteristics to the participants in the study and living in Kanchanaburi province. For the Cronbach's alpha coefficient of BI, GHQ, and SF-36 were .80, .76, and .90 respectively.

Third, we applied the Home-based Rehabilitation Nursing Program (HRNP) for 12 weeks, and the materials e.g. a stroke handbook, a VCD, a record form for daily monitoring of exercise training, and a flow chart for monitoring complications. For content validity the HRNP was evaluated by the same four experts.

**Ethical considerations**

The ethical review committee of Faculty of Nursing, Burapha University (No.10-09-2558) and Institutional Review Board Committee (IRB) of Paholpolpayuhasena Hospital (No.2015-05) approved this research project. The procedures of this study were fully explained and informed consent was obtained from each participant prior to participation in the study.

**Data collection**

Data collection procedure was conducted at the stroke clinic. The research assistants were trained by the researcher to independently collect data on four-time period.

**Data analysis**

The participants' demographic data was analyzed by using descriptive statistics comprising frequency, percentage, mean, and standard deviation. Hypothesis were tested by using Repeated Measure Multivariate Analysis of Variance (RM- MANOVA).

**Results**

The majority of stroke survivors in this study were 18 male and 6 females having completed primary school. The mean age of participants in the intervention group was 56.75 (SD = 7.742), and that in the control group was 55.96 (SD = 6.132). All participants were Buddhists. The income of the intervention group was about 10,001-15,000 baht per month and the income in the control group was mostly less than 5,000 baht per month. The MRS of participants in both groups showed a slight disability level. All participants had caregivers (100%) and most of them were spouse (60.90%, 62.50% respectively). The participants' characteristics were analyzed to determine the homogeneity between intervention group and control group by means of the Chi-square test. There were no significant differences in demographic characteristics between the intervention and control group ($p > .05$).

**Table 1 Mean score of the functional status, health perception and HRQoL**

| Variables | Group (n = 24) | Baseline M (SD) | Week 4 M (SD) | Week 8 M (SD) | Week 12 M (SD) |
|---|---|---|---|---|---|
| Functional status | HRNP | 70.63 (27.73) | 86.25 (20.12) | 89.38 (16.24) | 92.50 (8.34) |
| | Control | 72.08 (18.35) | 83.12 (15.32) | 84.58 (15.24) | 82.91 (16.21) |
| Health Perception | HRNP | 5.63 (4.42) | 1.29 (2.18) | 0 .58 (1.44) | 0.41 (0.20) |
| | Control | 6.63 (4.52) | 5.29 (3.80) | 4.88 (3.49) | 5.20 (3.21) |
| HRQoL | HRNP | 55.29 (9.91) | 100.63 ( 12.69) | 117.63 (15.19) | 134.12 (7.65) |
| | Control | 54.54 (12.14) | 83.08 (16.75) | 84.21 (17.79) | 83.58 (16.42) |

In Table 1, the mean scores of functional status (BI), health perception (GHQ) and HRQoL (SF-36) are presented. The intervention group, after receiving the intervention, the mean scores of functional status increased from baseline to week 4 and increased from week 4 to week 8, and week 8 to week 12 (Mean = 86.25, SD = 20.12 Mean = 89.38, SD = 16.24, and Mean = 92.50, SD = 8.34, respectively), while in the control group the mean score of functional status slightly increased. Though, the mean health perception score decreased over time (Mean = 5.63, SD = 4.42, Mean = 1.29, SD = 2.18, Mean = .58, SD = 1.44, and Mean = .41, SD = .20 respectively), the mean score of HRQoL increased over time from week 4 to week 8, and week 12 (Mean = 100.63, SD = 12.69, Mean = 117.63, SD = 15.19, Mean = 134.12, SD = 7.65, respectively). A little change in the control group was observed.

**Table 2 Comparison of functional status, health perception and HRQoL between groups and within group**

| Effect | | Value | F | Hypothesis df | Error Df | p-value |
|---|---|---|---|---|---|---|
| Between subjects | | | | | | |
| Group | Pillai's Trace | .56 | 18.84 | 3 | 44 | < .001*** |
| Within subjects | | | | | | |
| Time | Pillai's Trace | .96 | 1.08 | 9 | 38 | < .001*** |
| Time * Group | Pillai's Trace | .83 | 20.54 | 9 | 38 | < .001*** |

*** $p < .001$

Comparison of the three dependent variables (functional status, health perception and HRQoL) are shown in Table 2. When comparing between groups, better health outcome in the intervention group ($V = .83$, $F(9.38) = 20.54$, $p < .001$) than the control group is shown at .05 level.

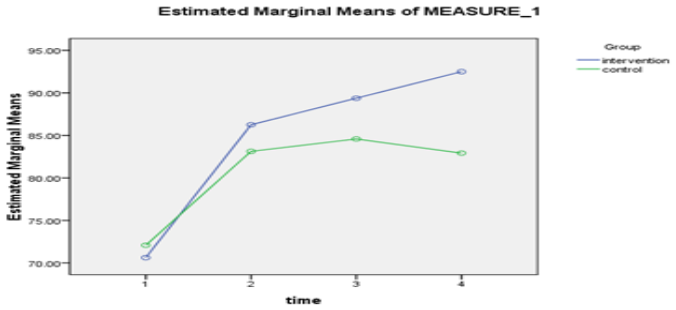


**Figure 1 Change in functional status between the intervention and control group over time**

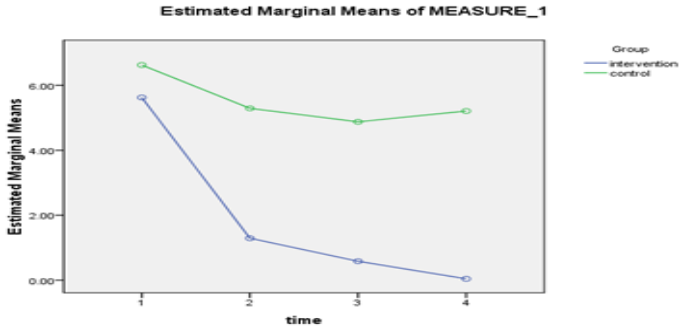


**Figure 2 Change in health perception between the intervention and control group over time**

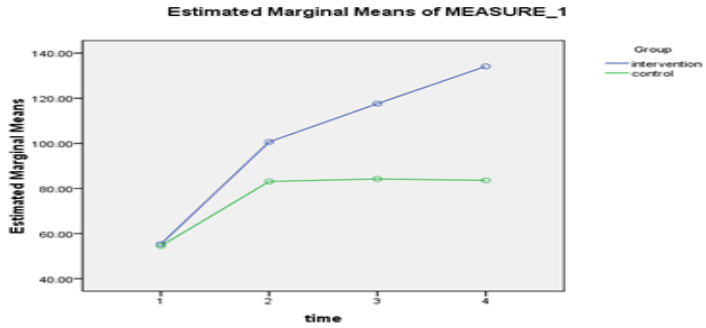


**Figure 3 Change in HRQoL between the intervention and control group over time**

## Discussion

The results demonstrated that the HRNP intervention could change all outcome variables. Results showed improvement of the functional status, health perceptions, and HRQoL in the mean scores at week 4, 8, and 12. Conversely, the participants in the control group had only slight improvements in functional status and HRQoL, and health perception mean scores had slightly decreased over time. Results after 12 weeks revealed that the intervention group were significantly different at the .05 level ($V=.56$, $F(3.44) = 18.84$, $p < .001$). There was also a significant multivariate main effect over time at the .05 level ($V = .96$, $F(9.38) = 1.08$, $p < .001$). Between group changes over time showed improved health outcomes for the intervention group at the .05 level ($V = .83$, $F(9, 38) = 20.54$, $p < .001$) as compared to the control group receiving usual care. These findings support the objective of the study and the hypotheses 1, 2, and 3. These findings are congruent

with previous studies such as Chaiyawat[15] and Khampolsiri.[17] The results showed that functional status at 3 months was significantly improved in the intervention group over the control group.

This study used the principles of the HRQoL concept, the rehabilitation nursing concept, and recommendations from previous studies to test program's effectiveness. Results of this study provide basic knowledge and necessary information for nurse and health care providers. It is necessary that nurses make comprehensive assessments and that they develop a plan to increase rehabilitation for stroke survivors and caregivers by focusing on important factors (individual characteristics categorized as demographic, psychological, and biological factors that influence health outcomes). Moreover, the characteristics of both groups had caregiving that may have affected the functional status of the stroke survivors. The home, neighborhood, and workplace can influence health outcomes either positively or negatively.[14] This study was not conducted to compare the level of stroke or subtype of ischemic stroke. So, the individual with underlying pathology may have effect on functional activities and recovery. Also, the mean scores of health perception changed at week 4, week 8, and week 12 after initiation of the HRNP intervention group and was significant as compared to the control group ($p < .05$). The HRNP intervention had a major impact on health perceptions. The HRNP intervention involved providing knowledge and a continually supportive approach. The participants in the HRNP gained more knowledge about prevention of recurrent stroke, a healthy lifestyle, increased physical activity, alcohol consumption reduction as well as that smoking cessation should be encouraged.[24] In addition, this intervention used teams for home and telephone visits. This process of the intervention used empathic understanding reflecting and enhancing health perceptions which focus on psychological effects after stroke for controlling feelings and observing problems. The HRNP intervention was only provided to adults whose ages ranged from 33-65 years. Thus, its application to other age groups such as older adults may be limited.

**Conclusions**

Nurses who come in contact with stroke survivors can play an important role in continuing stroke care to improve rehabilitation by initiating discussion of stroke health information using the three phases of the HRNP model. This model identifies effectiveness through performance measurement, resources, and true collaboration.

**Implications for practice, education, and policy**

The findings of this research may guide further studies to be generalized in other settings such as the PCU or other settings in Thailand. It would be useful to compare the impact of the program with different contextual features, whcih may affect the implementation of the intervention. Additionally, this study may provide evidence for the Ministry of Public Health or municipality authorities to strengthen Thai health care capacity and establish such services in community to improve the quality of care and professional standard in the future.

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