Original Article

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Outcomes of Speech and Language Abilities and Quality of Life in Thai People with Aphasia by Group Therapy

Tidajun Jiaranai, B.Sc.[1], Jeamjai Jeeraumporn, Ph.D.[1]*, Sumalee Dechongkit, Ph.D.[1], Montip Tiensuwan, Ph.D.[2]

[1]Department of Communication Sciences and Disorders, Faculty of Medicine Ramathibodi Hospital,

[2]Department of Mathematics, Faculty of Science, Mahidol University, Ratchathewi, Bangkok 10400, Thailand.

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Abstract:

Objective: The purpose of this study was to compare before- and after-scores of speech and language abilities, and quality of life of Thai people with aphasia.

Material and Methods: A cross-sectional study was conducted at the Speech Clinic in Ramathibodi Hospital from July 2016 to March 2017. Participants were 11 Thai people with aphasia. They received group therapy for three hours per session, for eight sessions, within three to five months. The measurement of speech and language abilities was assessed using the Thai Adaptation of the Western Aphasia Battery (WAB). The measurement of quality of life was assessed using the Thai version of the Stroke Impact Scale (SIS) 3.0. The results were analyzed using descriptive statistics and a paired samples t-test for comparisons of the mean scores before and after group therapy.

Results: Of the participants, there were 8 males (72.8%) and 3 females (27.3%) with aphasia. They ranged in age from 27 to 68, with a mean age of 48.55±13.42 years. Results showed that the differences in the improvements of speech and language abilities scores and quality of life scores of these participants after group therapy were significant and higher than their scores before group therapy (p-value<0.01).

Conclusion: Group therapy may be an efficient and effective way to rehabilitate the speech and language abilities and quality of life of Thai people with aphasia.

Keywords: aphasia, group therapy, quality of life, speech and language abilities

Contact: Jeamjai Jeeraumporn, Ph.D.
Department of Communication Sciences and Disorders,
Faculty of Medicine Ramathibodi Hospital, Mahidol University, Ratchathewi,
Bangkok 10400, Thailand.
E-mail: jeamjai.jee@mahidol.ac.th

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Introduction

Aphasia is an acquired impairment in one or more language modality as the result of lesions in the dominant hemisphere of the brain used for language. The impairment affects both receptive and expressive language, including reading and writing abilities.[1-3] Although aphasia can result from a head injury, brain tumor, or brain infection, the most common cause of aphasia is a stroke.[1,4] Studies have found that the incidence of aphasia occurring after a stroke is between 24 to 36 percent, approximately one-third of stroke patients.[4-6]

When stroke patients have been diagnosed with aphasia, the severity of receptive and expressive language impairment can range from mild to severe. The effect of losing the ability to comprehend and express language has an impact on daily life, occupations, social and emotional behavior. These effects can result in difficulty in undertaking the activities of daily life that require language skills, such as using a telephone, ordering food or, writing a letter.[1,7,8] People with aphasia may withdraw from society. Many studies have reported that they frequently face social exclusion and a decrease in both social activities and contacts. They often have to leave their occupation.[9-11] In addition, a lack of social communication causes people with aphasia to have less self-confidence and a feeling of worthlessness. As a consequence, they have a tendency towards, anxiety, loneliness, depression, and frustration.[12]

The effects that arise from aphasia can cause changes in quality of life. Many studies report that aphasia is significantly correlated with a low quality of life.[8-10,13-15] Therefore, people with aphasia should be referred to a speech and language pathologist for speech and language therapy in order to diminish and prevent the effects of aphasia.[1,4]

The type of speech and language therapy for people with aphasia can be divided into two types, individual therapy and group therapy.[1,16] Many studies have often focused on individual therapy, which considers specific speech and language impairments in each skill.[1,17] Nevertheless, some studies found that the generalization of speech and language abilities from individual therapy gains into functional communication is not as good as it should be, because the setting and environment in individual therapy comprises only a single patient and a speech and language pathologist. Sometimes the patient may not want to talk much, resulting in a reduced opportunity for using speech and language abilities to communicate.[1,18,19] Consequently, there are some researchers who propose the concept of group therapy. Setting and environment in group therapy are composed of a speech and language pathologist and other group members. People with aphasia in groups may be more comfortable and enthusiastic to communicate. The group therapy setting also provided opportunities for conversations with more people, including peer modeling. That is, people with aphasia can interact with others, and exchange their ideas and feelings through language usage at the same time. These opportunities may increase the probability for generalization of speech and language abilities into functional communication for interaction with others, including daily interactions at home and in communities.[20-29] Many studies have reported positive results relative to speech and language abilities, psychological well-being, life participation, and quality of life in people with aphasia after group therapy, which showed that group therapy provides opportunities for both language usage and interaction with others.[20,22-25,28,29]

However, prior studies about the use of group therapy for people with aphasia in Thailand were not found. Therefore, the researchers interested in conducting a study about how group therapy could lead to an improvement in the speech and language abilities and quality of life of Thai people with aphasia. The objectives of the present study were to compare before- and after-

scores of speech and language abilities, and quality of life of Thai people with aphasia.

Material and Methods

Ethical consideration

The present study was approved by the Ethical Clearance Committee of the Faculty of Medicine Ramathibodi Hospital, Mahidol University (ID 07-59-28) before data collection. The participants or close relatives or caregivers were required to sign the informed consent form in order to participate in the present study.

Study design and participants

A cross-sectional study was conducted at the Speech Clinic in Ramathibodi Hospital from July 2016 to March 2017. Participants were 11 Thai people with aphasia. There were 8 males and 3 females. All participants ranged in age from 27 to 68 years. They had Aphasia Quotient (AQ) scores of at least 26 on the Thai Adaptation of the Western Aphasia Battery (WAB).[30] All were native Thai speakers who had at least a primary education. The researchers excluded any persons who had a history of psychiatric disorders and other neurological illnesses.

Instruments

The instruments used in the present study consisted of the Thai Adaptation of the WAB[30] and the Thai version of the Stroke Impact Scale (SIS) 3.0.[31] First, the Thai Adaptation of the WAB, in parts of the AQ scores, was used to assess the speech and language abilities. It includes spontaneous speech, auditory verbal comprehension, repetition, and naming.[30] Second, the Thai version of the SIS 3.0 was used to assess the quality of life. The SIS 3.0 Thai version was translated and adapted by Khampolsiri.[31] There are 59 items that measure eight domains: strength, hand function, mobility, activities of daily life, emotions, memory and thinking, communication, and social participation. The rating scale ranged from one to five in each domain.[31]

Administrative procedure

All participants were asked to provide their personal data and medical history in the recorded form. Speech and language abilities were assessed using the Thai Adaptation of the WAB, in parts of the AQ scores, before the beginning of group therapy. The Thai version of the SIS 3.0 was completed by a close relative or caregiver of each participant for assessing quality of life. All assessments were performed by the 1st researcher.

All participants were allocated to a mild or moderate to severe group based on their AQ scores from the Thai Adaptation of the WAB by following criteria on taxonomic table of the WAB of Kertesz in 1982.[32] Each participant received group therapy for three hours per session, eight sessions, within three to five months. In the meantime, all participants would receive only group therapy. All sessions were conducted by the 1st researcher. The indirect speech and language approach was used for group therapy, which activities are less structured such as general conversation, and role playing. The goals of group therapy focused on improving the speech and language abilities in daily life and encouraging the group members to use their communication skills, initiate conversations, and increase their confidence in communicating with other group members. Each session was conducted based on one of four themes composed of common things in daily life, food and fruit, daily routines, and activities in life. Each theme consisted of five activities such as greeting each other, asking and answering questions, practicing automatic speech tasks, talking about and discussing topics, naming and repetitious tasks, and practicing reading and writing skills. Homework was assigned and explained by the 1st researcher to participants and close relative or caregiver in order that they would suggest to

participants how to do homework. Participants would practice and bring it back in the next session.

After one week post-therapy, the Thai Adaptation of the WAB was used to assess speech and language abilities again. Moreover, the Thai version of the SIS 3.0 was completed by a close relative or caregiver of each patient again.

Statistical analysis

All data were analyzed using the IBM SPSS Statistics for windows version 24. Descriptive statistics, including means and standard deviations, were used to describe the AQ scores and quality of life scores before and after group therapy. Comparisons of the mean scores on the participants' scores of speech and language abilities and the quality of life before and after group therapy were made using a paired samples t-test. Statistical significance was indicated if p-value<0.05.

Results

Demographic data

Of the eleven participants with aphasia, 8 were males (72.7%) and 3 were females (27.3%). Participants ranged in age from 27 to 68 years. The duration of time post-stroke ranged from 1 to 108 months. The scores of AQ could be classified as mild, moderate, and severe degree. The aphasia type of all participants could be classified as Broca's, transcortical motor, Wernicke's, transcortical sensory, and anomic. The demographic characteristics are summarized in Table 1.

A comparison of speech and language abilities scores of Thai people with aphasia before and after group therapy

Before group therapy, scores of all participants on their speech and language abilities from the Thai Adaptation of the WAB ranged from 37.20 to 87.70 points, with a mean score of 66.44±15.20. After group therapy, scores ranged from 43.90 to 93.60 points, with a mean score of 74.66±16.31 (Figure 1).

The scores on each part from the Thai Adaptation of the WAB were described as follow. Before group therapy, scores on spontaneous speech part ranged from 9.00 to 16.00 points, with a mean score of 11.91±2.17. After group therapy, scores ranged from 11.00 to 18.00 points, with a mean score of 14.27±2.45 (Figure 2).

Table 1 Demographic characteristics of participants (n=11)

Demographic data	Number (%)
Gender	
Male	8 (72.7)
Female	3 (27.3)
Age (years)	
Mean (S.D.)	48.55 (13.4)
Duration of illness (months)	
Mean (S.D.)	21.18 (32.0)
AQ scores (before group therapy)	
Mean (S.D.)	66.44 (15.2)
Degree of severity	
Mild	4 (36.4)
Moderate	6 (54.6)
Severe	1 (9.1)
Type of aphasia	
Before group therapy	
Broca's	5 (45.4)
Transcortical motor	2 (18.2)
Transcortical sensory	2 (18.2)
Anomic	2 (18.2)
After group therapy	
Broca's	2 (18.2)
Transcortical motor	2 (18.2)
Wernicke's	1 (9.1)
Anomic	6 (54.5)

AQ scores=Aphasia Quotient scores, S.D.=standard deviation

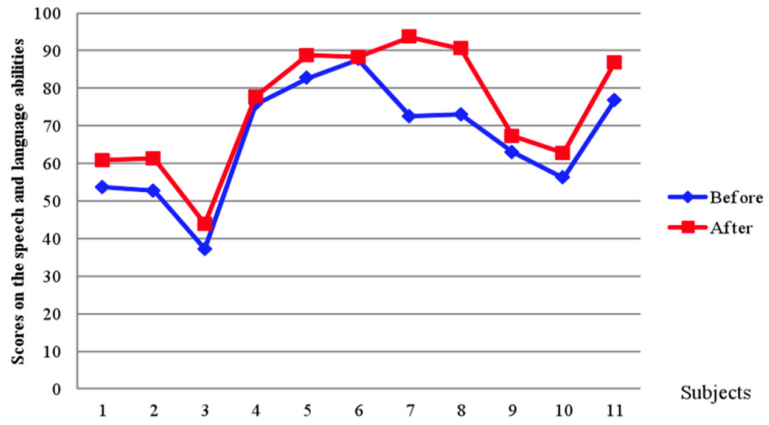

Figure 1 Speech and language abilities scores of all participants before and after group therapy

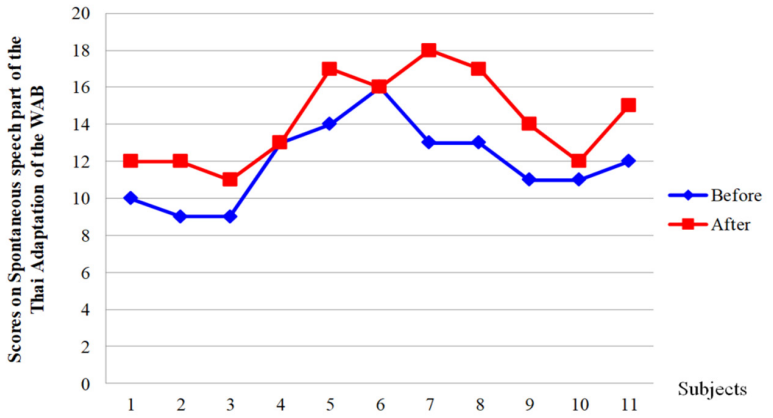

Figure 2 Spontaneous speech scores before and after group therapy

Before group therapy, scores on auditory verbal comprehension part ranged from 4.05 to 9.85 points, with a mean score of 6.99±2.26. After group therapy, scores ranged from 4.75 to 9.85 points, with a mean score of 7.70±2.26 (Figure 3).

Before group therapy, scores on repetition part ranged from 1.80 to 10.00 points, with a mean score of 7.80±2.36. After group therapy, scores ranged from 2.30 to 10.00 points, with a mean score of 8.16±2.35 (Figure 4).

Before group therapy, scores on naming part ranged from 2.90 to 8.70 points, with a mean score of 6.52±1.77. After group therapy, scores ranged from 3.90 to 9.30 points, with a mean score of 7.20±1.82 (Figure 5).

The comparative results of the mean speech and language ability scores before and after group therapy showed that the differences in the scores after group therapy were statistically significant and higher than the scores before group therapy at p-value<0.01 (Table 2).

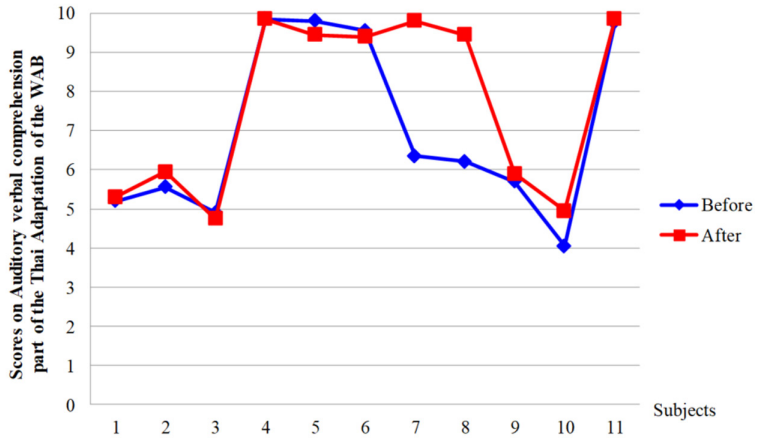

Figure 3 Auditory verbal comprehension scores before and after group therapy

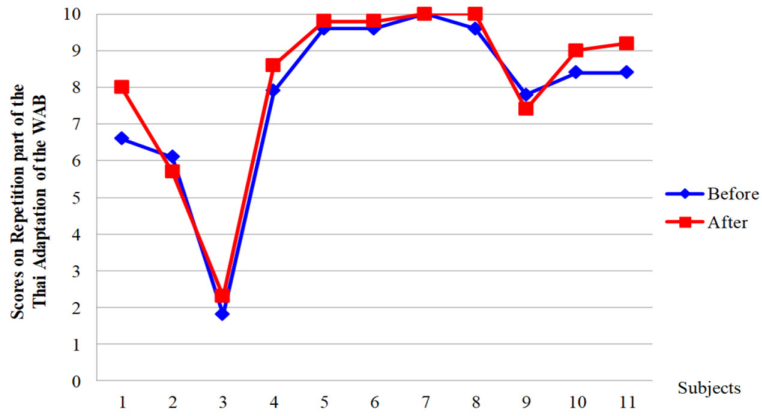

Figure 4 Repetition scores before and after group therapy

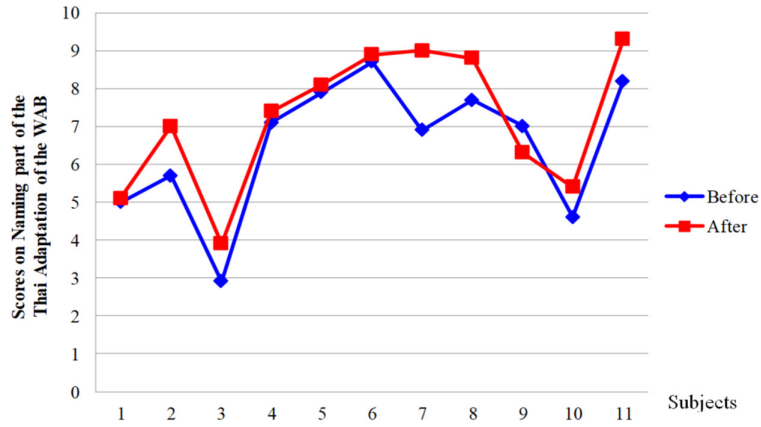

Figure 5 Naming scores before and after group therapy

Table 2 Comparative results of the mean speech and language ability scores before and after group therapy

Scores	t	Df	P-value
AQ scores	-4.42**	10	0.001

**Significant at p-value<0.01

AQ scores=Aphasia Quotient scores, t=t-test, Df=degree of freedom

A comparison of the quality of life scores of Thai people with aphasia before and after group therapy

Before group therapy, scores of all participants on their quality of life from the Thai version of the SIS 3.0 ranged from 32.06 to 82.79 points with a mean score of 57.96±18.75. After group therapy, scores ranged from 36.69 to 90.71 points with a mean score of 67.85±18.80 (Figure 6).

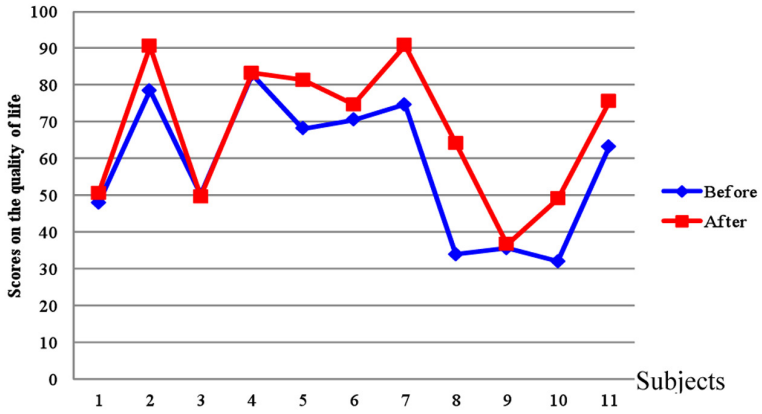

Figure 6 Quality of life scores of all participants before and after group therapy

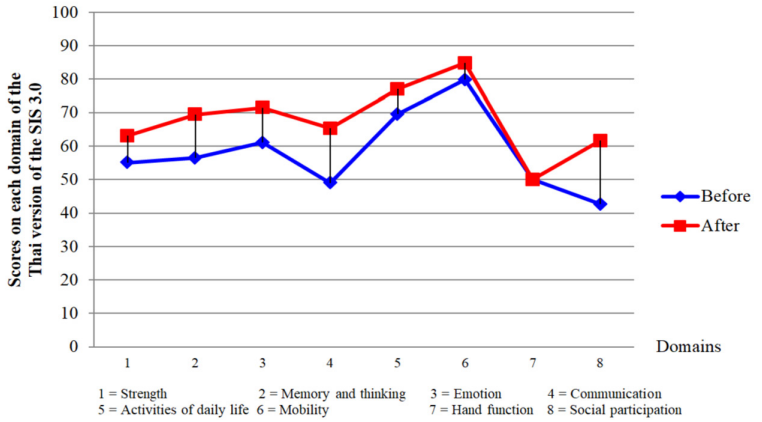

Figure 7 Mean scores on each domain before and after group therapy

The mean scores on each domain before and after group therapy from the Thai version of the SIS 3.0 showed that the mean scores of each domain after group therapy were mostly improved, especially in the domains of communication and social participation (Figure 7).

The comparative results of the mean quality of life scores before and after group therapy showed that the differences in the scores after group therapy were statistically significant and higher than the scores before group therapy at p-value<0.01 (Table 3).

Table 3 Comparative results of the mean quality of life scores before and after group therapy

Scores	t	Df	P-value
Quality of life scores	-3.49**	10	0.006

**Significant at p-value<0.01

t=t-test, Df=degree of freedom

Discussion

Group therapy was conducted for eleven people with aphasia. First of all, the present study compared the speech and language abilities before and after group therapy. Result showed that the speech and language ability scores after group therapy were significantly higher than the scores before group therapy (Table 2).

The results of this study are consistent with previous studies, conducted by Elman and Bernstein-Ellis[20], Wertz et al.[28] and Bollinger et al.[23] All the studies used group therapy for enhancing the speech and language abilities of people with aphasia. The consistency of the results may be attributed to the similar goals and activities of group therapy. That is because the goals of group therapy were focused on improving the speech and language abilities used in daily life, e.g. encourage the group members to use their communication skills, initiate conversations, and enhance their confidence in communications with others. The activities of group therapy included talking about and discussing topics, and asking and answering general questions. These activities also included specific language activities such as word repetition, and naming.

Duration of illness from aphasia, which in the present study was divided into the two durations of the acute and chronic phase.[20] Accordingly, the present study included 3 participants with acute aphasia and 8 participants with chronic aphasia. All participants in both durations demonstrated an improvement in their speech and language abilities after group therapy. Our results support those of Wertz et al.[28], which was conducted on people with acute aphasia, and the studies of Elman and Bernstein-Ellis[20] and Bollinger et al.[23] which were conducted on people with chronic aphasia. The similar results of these studies show that group therapy was an effective therapy for the improvement of the speech and language abilities of people with both acute and chronic aphasia.

The present study did not restrict participation to only certain types of aphasia; it focus on the general speech and language deficits caused by aphasia and the deficiencies were not subdivided by each subskill on speech and language competence. This method in the present study was similar to that of Wertz et al.[28], which did not limit the types of aphasia of subjects and focused on their general speech and language deficits. Furthermore, indirect speech and language group therapy was used in the present study, which was also similar to the study of Wertz et al.[28] These may be some reasons why the results of the present study agreed with the results of Wertz et al.[28] However, the changing in scores of each part from the Thai Adaptation of the WAB was related to change in the types of aphasia in many participants. For example, before group therapy, there were 2 participants with Broca's aphasia and 1 participant with transcortical

motor aphasia. After group therapy, the scores from spontaneous speech part increased, which were related to the participants being able to speak more fluently and the type of aphasia changed into the Wernicke and anomic aphasia. In addition to, there were 2 participants with transcortical sensory aphasia. After group therapy, the scores from auditory verbal comprehension part increased, which the type of aphasia changed into the anomic aphasia.

Moreover, the researchers noticed that people with aphasia in the present study tried to use their speech and language abilities during group therapy by themselves after 2-4 sessions. For example, some participants began to greet each other by themselves, tried to call the names of other members, and tried to help other group members on naming tasks. According to these notices from the researchers, it may be concluded that group therapy is a method for coping with the speech and language problems of people with aphasia.

Nevertheless, the findings of the present study were different from the study of Aten, Caligiuri, and Holland.[22] This may be because of the different types of group therapy that were used. Sociolinguistic group therapy was used by Aten, Caligiuri, and Holland[22] and indirect speech and language group therapy was used in the present study, although the amount of time devoted to group therapy, the durations of illness from aphasia, and the ages of the participants in both studies were similar.

Second, the present study compared the quality of life before and after group therapy. Results show that the quality of life scores after group therapy were significantly higher than the scores before group therapy (Table 3).

In the present study, group therapy was not intended to be a direct intervention relative to quality of life. On the contrary, group therapy was provided to enhance the speech and language abilities of people with aphasia. During group therapy sessions, the researchers noticed that participants had an opportunity to communicate with other members in the group, which would improve their pragmatic skills such as topic initiation and turn-taking. The group setting also provided opportunities for practicing more natural communication activities, and participating in peer modeling. These opportunities may increase the probability that participants will generalize the speech and language abilities gained from group therapy into more effective communication in daily life. The notices of the researchers resembled those in the studies of Lyon[16], Elman and Bernstein-Ellis[20], Aten, Caligiuri, and Holland[22], and Layfield et al.[26], which believed that effective communication was a critical factor in having a positive quality of life.[33,34]

These findings of the present study agree with those in the studies of Elman and Bernstein-Ellis[20], Fama, Baron, Hatfield, and Turkeltaub[25], and Van Der Gaag et al.[29] In these studies, people with aphasia, their family members and/or caregivers commented on the changes in the participants' lives that occurred after having group therapy. That is, quality of life, self-confidence, participation in activities, and social interactions had all changed in positive ways. For example, they experienced more confident in communication, talking with strangers in stores, leaving their homes and meeting others for the first time in several years, beginning to use public transportation to travel to the group therapy location when encouraged by other group members, and desiring more contact with family and friends. With this increased desire to have more contact with people, relationships with families and friends improved. These comments were the same as those in the present study, which may be due to the types of activities in group of the present study, e.g. communication skills used in daily life, topic discussions, automatic speech tasks, and naming were similar to the studies conducted by Elman and Bernstein-Ellis[20], Fama, Baron, Hatfield, and Turkeltaub[25], and Van Der Gaag et al.[29] Moreover, the durations of illness from aphasia in the present study

were also similar to the studies of Elman and Bernstein-Ellis[20], and Van Der Gaag et al.[29], which conducted on people with chronic aphasia, and the study of Fama et al.[25] which conducted on people with acute aphasia.

Regarding speech pathology: quality of life research conducted on people with aphasia were often studies on aspects pertaining to psychological well-being, social interaction and participation, functional communication ability, and life satisfaction and participation.[14,15,24,33] Ross et al.[24] studied the quality of life of people with aphasia in the context of group therapy. They evaluated the quality of life relative to the aspects of functional communication ability, life participation, and psychological well-being. The results showed positive changes in life participation and psychological well-being, which were one aspect of quality of life. The findings of the present study agree with the results of Ross et al.[24] This agreement may be because some activities in group therapy were similar, such as topic discussions and experiences sharing. Moreover, the durations of illness from aphasia and the ages of the participants were also similar. In particular, both studies stated that the oldest participant also benefited from group therapy. Accordingly, it can be stated that beneficial change was not limited to the younger patients. This evidence supported the notion that age was not a factor in determining whether or not group therapy should be provided.[24]

The limitation of the present study was the small number of the participants, which were very different in demographic characteristics. Therefore, they might not be able to demonstrate about factors such as age, duration of illness, and severity related to the improvements of speech and language abilities and quality of life. Another limitation was that the person who performed assessment and therapy was the same person, which might lead to prejudice.

A further study should be conducted with a larger sample size to confirm the effectiveness of group therapy for people with aphasia and to investigate factors affecting the improvements of speech and language abilities and quality of life. Including, the person who performed assessment and therapy should be different person and blind to participants in group. Moreover, a further study should include assessments during the follow-up period, such as 4 weeks or 3 months following the completion of group therapy. These additional assessments may show that participants can maintain their improvements in speech and language abilities and quality of life.

Conclusion

The present study was conducted in order to compare the speech and language abilities and quality of life of people with aphasia before and after group therapy. For the speech and language ability scores, the scores after group therapy were significantly higher than the scores before group therapy. Furthermore, the results also show that the quality of life scores after group therapy were significantly higher than the scores before group therapy. Therefore, group therapy may be an efficient and effective way to rehabilitate the speech and language abilities and quality of life of Thai people with aphasia.

Acknowledgement

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Conflict of interest

No potential conflict of interest relevant to this article was reported.

References

1. LaPointe LL, Murdoch BE, Stierwalt JAG. Brain-based communication disorders. San Diego: Plural Publishing; 2010.
2. Basso A, Forbes M, Boller F. Rehabilitation of aphasia. Handb Clin Neurol 2013;110:325-34.
3. Goodglass H, Kaplan E. The assessment of aphasia and related disorders. 2nd ed. Philadelphia: Lea & Febiger; 1983.
4. Brady MC, Kelly H, Godwin J, Enderby P, Campbell P. Speech and language therapy for aphasia following stroke. Cochrane Database Syst Rev 2016;5:1-397.
5. Engelter ST, Gostynski M, Papa S, Frei M, Born C, Ajdacic-Gross V, et al. Epidemiology of aphasia attributable to first ischemic stroke: incidence, severity, fluency, etiology, and thrombolysis. Stroke 2006;37:1379-84.
6. Laska AC, Hellblom A, Murray V, Kahan T, Von Arbin M. Aphasia in acute stroke and relation to outcome. J Intern Med 2001;249:413-22.
7. Spaccavento S, Craca A, Del Prete M, Falcone R, Colucci A, Di Palma A, et al. Quality of life measurement and outcome in aphasia. Neuropsychiatr Dis Treat 2014;10:27-37.
8. Intercollegiate Stroke Working Party. National clinical guideline for stroke. 3rd ed. London: Royal College of Physicians; 2008.
9. Parr S. Living with severe aphasia: tracking social exclusion. Aphasiology 2007;21:98-123.
10. Ross K, Wertz R. Quality of life with and without aphasia. Aphasiology 2003;17:355-64.
11. Hinckley JJ. Vocational and social outcomes of adults with chronic aphasia. J Commun Disord 2002;35:543-60.
12. Tanner DC. Eclectic perspectives on the psychology of aphasia. J Allied Health 2003;32:256-60.
13. Kauhanen ML, Korpelainen JT, Hiltunen P, Maatta R, Mononen H, Brusin E, et al. Aphasia, depression, and non-verbal cognitive impairment in ischaemic stroke. Cerebrovasc Dis 2000;10: 455-61.
14. Hilari K, Klippi A, Constantinidou F, Horton S, Penn C, Raymer A, et al. An international perspective on quality of life in aphasia: a survey of clinician views and practices from sixteen countries. Folia Phoniatr Logop 2015;67:119-30.
15. Hinckley JJ. Investigating the predictors of lifestyle satisfaction among younger adults with chronic aphasia. Aphasiology 1998;12:509-18.
16. ASHA's Cultural Competence Practice Portal Team editors. Aphasia [monograph on the Internet]. c1997-2016 [cited 2016 Jan 20]. Available from: http://www.asha.org/PRP SpecificTopic.aspx?folderid=8589934663&section=Treatment
17. Rosenbek JC, LaPointe LL, Wertz RT. Aphasia: a clinical approach. Boston: Little, Brown and Company; 1989.
18. Cermak C. The efficacy of group therapy for adults with chronic aphasia. Poster session presented at: 7th Annual Research Day; 2011; School of Communication Sciences and Disorders, Western University, Ontario, Canada. Ontario: Western University; 2011.
19. Lyon JG. Communication use and participation in life for adults with aphasia in natural settings. Am J Speech Lang Pathol 1992;1:7-14.
20. Elman RJ, Bernstein-Ellis E. The efficacy of group communication treatment in adults with chronic aphasia. J Speech Lang Hear Res 1999;42:411-9.
21. Brookshire RH. Introduction to neurogenic communication disorders. 8th ed. Saint Louis: Mosby Elsevier; 2015.
22. Aten JL, Caligiuri MP, Holland AL. The efficacy of functional communication therapy for chronic aphasic patients. J Speech Hear Disord 1982;47:93-6.
23. Bollinger RL, Musson ND, Holland AL. A study of group communication intervention with chronically aphasic persons. Aphasiology 1993;7:301-13.
24. Ross A, Winslow I, Marchant P, Brumfitt S. Evaluation of communication, life participation and psychological well being in chronic aphasia: the influence of group intervention. Aphasiology 2006;20:427-48.
25. Fama ME, Baron CR, Hatfield B, Turkeltaub PE. Group therapy as a social context for aphasia recovery: a pilot, observational study in an acute rehabilitation hospital. Top Stroke Rehabil 2016;23:276-83.
26. Layfield CA, Ballard KJ, Robin DA. Evaluating group therapy for aphasia: what is the evidence? EBP Briefs 2013;7:1-17.
27. Kearns KP, Elman RJ. Group therapy for aphasia: theoretical and practical considerations. In: Chapey R, editor. Language intervention strategies in aphasia and related neurogenic communication disorders. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2008;p.376-400.
28. Wertz RT, Collins MJ, Weiss D, Kurtzke JF, Friden T, Brookshire RH, et al. Veterans administration cooperative study on aphasia: a comparison of individual and group treatment. J Speech Hear Res 1981;24:580-94.

29. Van Der Gaag A, Smith L, Davis S, Moss B, Cornelius V, Laing S, et al. Therapy and support services for people with long-term stroke and aphasia and their relatives: a six-month follow-up study. Clin Rehabil 2005;19:372-80.
30. Dardarananda R, Potisuk S, Gandour J, Holasuit S. Thai Adaptation of the Western Aphasia Battery (WAB). Chiang Mai Med J 1995;34:157-9.
31. Khampolsiri T. A home-based nursing intervention for enhancing quality of life of stroke survivors (Dissertation). Chiang Mai: Chiang Mai University; 2006.
32. Barfod V, editor. Western Aphasia Battery: in depth review [homepage on the Internet]. Montreal: Canadian Partnership for Stroke Recovery; 2013 [cited 2016 Jan 30]. Available from: https://www.strokengine.ca/en/indepth/in-depth-review-of-the-wab/
33. Cruice M, Worrall L, Hickson L, Murison R. Finding a focus for quality of life with aphasia: social and emotional health, and psychological well-being. Aphasiology 2003;17:333-53.
34. Worrall L, Holland A. Editorial: quality of life in aphasia. Aphasiology 2003;17:329-32.