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Health Education: Mirror Therapy for Increasing Foot Muscle Strength

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Abstract: Stroke is one of the leading causes of disability, impacting motor function, particularly extremity muscle strength. This condition leads to limitations in daily activities and a decline in patients' quality of life. One non-pharmacological intervention that can be used to improve motor function is mirror therapy. This community service aims to improve the knowledge and skills of stroke patients and their families thru health education on mirror therapy as an effort to increase muscle strength. The community service activities were carried out on stroke patients in the community using educational methods such as counselling, demonstrations, and direct practice of mirror therapy. Evaluation was conducted by measuring knowledge before and after education, as well as assessing muscle strength using the muscle strength scale. The results of the activities showed an increase in knowledge of patients and their families regarding mirror therapy after receiving education. Mirror therapy health education has been proven effective as a simple, easy-to-implement intervention that can be done independently at home. This activity is expected to be a sustainable alternative for rehabilitative intervention in an effort to improve the independence and quality of life of stroke patients in the community.

Keywords: Health Education**;** Mirror Therapy; Muscle Strength; Stroke.

INTRODUCTION

Stroke is one of the leading causes of functional disability worldwide (1,2), characterized by neuromuscular impairment due to the interruption of blood flow to the brain, resulting in tissue damage and motor deficits, including decreased muscle strength in both upper and lower extremities (3–5). Stroke patients often experience hemiparesis, which impacts their ability to perform daily activities and significantly reduces their quality of life (6,7). Research shows that appropriate rehabilitation therapy is necessary to minimize the impact of these motor deficits and help patients achieve optimal motor function recovery.

One of the motor rehabilitation approaches that is currently being researched more and more is mirror therapy. Mirror therapy is a non-pharmacological technique that utilizes visual feedback from a mirror to provide the brain with the illusion of undisturbed limb movement, thereby stimulating the motor areas to undergo sensorimotor reorganization and increase muscle strength on the stroke-affected side of the body (8–12). This approach is easy to implement, relatively inexpensive, and can be done independently or guided by healthcare professionals.

Some recent studies show that mirror therapy is effective in improving muscle strength in stroke patients.

Beside increasing muscle strength, evidence from mirror therapy studies shows its benefits in improving overall upper extremity motor function in post-stroke patients, especially when performed regularly as part of a rehabilitation program. Mirror therapy can stimulate motor reorganization and help patients improve movements impaired by hemiparesis.
The above conditions reinforce the importance of health education for stroke patients, their families, and the community regarding mirror therapy techniques. This education is expected to increase public understanding of simple, effective rehabilitation therapies that can be applied at home, so that stroke patients receive ongoing support to improve their muscle strength and functional abilities.

METHOD OF IMPLEMENTATION

Activity Design : This community service activity uses an educational-participatory approach, which is health education combined with demonstrations and hands-on practice (learning by doing). This approach was chosen so that stroke patients and their families would not only understand the concept of mirror therapy, but also be able to apply it independently and continuously at home.

Activity Objectives :
The activity objectives include:

1. Stroke patients with motor impairments (mild to moderate hemiparesis/hemiplegia)
2. Families or caregivers of stroke patients
3. Surrounding community members who play a role in patient care Family involvement is an important part because families serve as therapy companions and supervisors of exercise adherence at home

Implementation Stages
a. Preparation Stage

1. Identify needs : Assess the motor condition of stroke patients and identify the level of knowledge of patients and families about post-stroke rehabilitation
2. Development of educational materials : Definition of mirror therapy, working principles and benefits of mirror therapy, indications and contraindications, steps for implementation and frequency and duration of exercises
3. Preparation of educational media : Medium-sized flat mirror, leaflet educational and illustrative videos or images.
4. Coordination with relevant parties : Health centers, elderly posyandu, or stroke patient communities

b. Implementation

Phase Health education is implemented thru the following methods:

1. Counselling (Interactive Lecture) : providing basic information about stroke and muscle strength disorders, explaining the concept of mirror therapy in a simple and communicative way, offering opportunities for questions and answers to improve understanding
2. Demonstration : The educator demonstrates the mirror therapy technique directly, showing the patient's position, mirror placement, and movements of the healthy extremity and explaining common mistakes that often occur.
3. Hands-on Practice (Return Demonstration) : The patient and family practice mirror therapy directly, the educator provides feedback and corrections and practice is done in stages according to the patient's ability.
4. Accompaniment : The patient is guided to perform therapy independently, the family is trained as a co-therapist at home and a daily exercise schedule is provided.

c. Evaluation Stage

Evaluation is conducted to assess the effectiveness of health education, including:

1. Knowledge Evaluation : Pre-test and post-test related to understanding mirror therapy
2. Skill Evaluation : The ability of patients and families to perform mirror therapy correctly
3. Outcome Evaluation : Observation of changes in extremity movement ability
4. Sustainability Evaluation : Adherence to home exercises and motivation of patients and families

RESULTS AND DISCUSSION

1. Characteristics of Participants

Table 1. Characteristics of Community Service Participants

Features	Quantity (n)	Percentage (%)
Gender		
Male	5	55
Women	4	45
Age		

Features	Quantity (n)	Percentage (%)
Late adults (45–59 years)	3	33
Elderly (≥60 yrs)	6	67
Stroke Type		
Ischemic stroke	2	22
Hemorrhagic stroke	7	78
Degree of Muscle Weakness		
Lightweight	3	33
Medium	6	67

Participants in community service activities are mostly stroke patients with impaired motor function in the form of mild to moderate hemiparesis. Participants are accompanied by family or caregivers who play an active role during the health education process and *mirror therapy practice*

2. Increase Participant Knowledge

Table 2. Participants' Knowledge Levels Before and After Health Education

Knowledge Level	Before Education n (%)	After Education n (%)
Good	22	56
Enough	44	44
Less	34	-
Total	100	100

The results of the evaluation showed an increase in participants' knowledge after being given health education. Before the education, most of the participants had less knowledge about *mirror therapy*. After the health education intervention, there was an increase in the number of participants with a good level of knowledge, which showed the effectiveness of the educational methods used.

3. Mirror Therapy Implementation Skills

Table 3. Participants' Skills in Doing Mirror Therapy

Skill Aspect	Before Education	After Education
Body position and mirror	Not accurate	Precise
Focus on mirror reflection	Less	Good
Healthy extremity movements	Uncoordinated	Coordinated
Family involvement	Low	Height

After demonstrations and hands-on practice, participants were able to do *mirror therapy* according to the procedure. Families also showed improved ability to accompany patients during exercises.

4. Impact on Patient Motivation and Independence

Table 4. The Impact of Health Education Mirror Therapy

Indicator	Before	After
Motivation for training	Low	Increase
Independence of home training	Not independent	Independent with companion
Training compliance	Irregular	Regular

Patients show increased motivation and confidence in performing exercises independently. The family is also more active in playing a role as a therapeutic companion at home.

5. Program Sustainability

Table 5. Mirror Therapy at Home Sustainability Plan

Aspects	Results
Willingness to continue therapy	Yes
Ease of application	Easy
Tool requirements	Minimal (mirror)
Sustainable potential	Height

The results of the service show that *mirror therapy* can be applied sustainably at home because it is simple, inexpensive, and easy to understand by patients and families.

The results of the evaluation showed a significant improvement in participants' understanding after mirror therapy health education. Before education, the majority of patients and families did not understand the basic concepts of *mirror therapy*, including how it works, therapeutic goals, and steps to implement it. After educational activities, there is a shift in understanding to the "good" category, showing that the extension model and direct practice are effective in transferring knowledge.

This is in accordance with the findings of the literature that suggest that *mirror therapy* needs to be delivered systematically so that participants can understand how visual feedback from mirror reflection stimulates sensorimotor reorganization of the brain, which is key in the post-stroke muscle recovery process. The implementation of informative education will strengthen

participants' understanding of doing therapy independently at home, as well as improve the type of exercises that are done correctly (13–15).

Patient and family skills in performing *mirror therapy* improved after educational interventions. At first, many participants had difficulty positioning the mirror correctly and focusing attention on the shadow of the healthy extremities, which led to less than optimal neural stimulation. After repeated practice and monitoring, execution skills look better, especially in maximizing visual feedback—an important element that has been shown to be effective in motor stimulation in stroke patients (11,12,16).

The literature also shows that regular use of *mirror therapy* with a duration of 15–50 minutes per day for several weeks can have a positive impact on motor function compared to without this therapy (8,10,17–19). In a systematic review, *mirror therapy* was associated with improved motor function of the upper and lower extremities, improvement of daily activity ability, and increased sensory-motor connectivity which had an effect on improving the skill of doing exercises on oneself.

In addition to physiological aspects, *mirror therapy* also has a positive psychosocial impact on patients. Increased motivation and independence in home exercises are related to a good understanding of the purpose of therapy and the hands-on experience of seeing the results of the exercises through visual feedback (8,20,21). Patients' confidence in doing independent exercises is also supported by clinical evidence that shows *mirror therapy* as a simple but effective approach in stroke rehabilitation .

Previous studies have shown that the combination of *mirror therapy* with conventional rehabilitation can stimulate neural reorganization better than conventional rehabilitation alone, thus having a positive effect not only on muscle strength but also on the patient's daily life activities (9,11,12,17,22).

The results of PkM show the readiness of participants to continue *mirror therapy* independently at home because of its easy, inexpensive nature, and can be done without special tools other than mirrors. This is important because the sustainability of post-PkM therapy is a key factor in the long-term recovery of stroke patients. Scientific studies suggest that consistent therapeutic doses (high frequency and long duration) are required to support optimal neuroplasticity.

CONCLUSION

Community Service (PkM) activities in the form of health education about *mirror therapy* in stroke patients showed positive and meaningful results. The majority of participants were stroke patients with mild to moderate hemiparesis who were accompanied by family or caregivers, thus enabling the implementation of participatory and sustainable health education.

The health education provided has proven to be effective in increasing the knowledge of patients and families about *mirror therapy*. Before the education,

most of the participants did not understand the basic concepts, working mechanisms, therapeutic goals, and steps to implement *mirror therapy*. After the educational activities and hands-on practice, there was an increase in the participants' understanding to the good category, which showed that the interactive counseling methods and direct demonstrations were able to transfer knowledge optimally.

In addition to increasing knowledge, this PkM activity also succeeded in improving the skills of patients and families in conducting *mirror therapy*. Participants who previously had difficulty in mirror placement, focusing on visual reflection, and coordinating healthy extremity movements, showed noticeable improvement after repeated mentoring and exercise. Family involvement as therapy companions also increased and became a supporting factor for the successful implementation of therapy.

From the psychosocial aspect, *mirror therapy* health education has a positive impact on the patient's motivation, confidence, and independence in doing exercises at home. Patients become more motivated to practice regularly, while families take an active role as therapeutic companions. This contributes to increased exercise compliance and the potential for continuous improvement of motor function.

In addition, the results of the evaluation show that *mirror therapy* has a high sustainability potential to be applied in the home environment. This therapy is simple, easy to understand, requires minimal tools, and does not require large costs, allowing patients and families to continue their training independently after the PkM activity ends. This sustainability is critical in supporting the long-term rehabilitation process and optimizing neuroplasticity in stroke patients.

Overall, mirror therapy health education in Community Service activities has proven to be effective as an applicative non-pharmacological rehabilitation strategy, empowering patients and families, and has the potential to improve muscle strength, independence, and quality of life of stroke patients if carried out regularly and continuously.

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