Brio International Journal of Nursing Research
Indexed Nursing Journal
www.bijnr.in YEAR: 2023 VOLUME: 4 ISSUE: 2

"Effectiveness of a Structured Swallowing Exercise Package on Swallowing Ability and Quality of Life among Post-Stroke Patients with Dysphagia: A Quasi-Experimental Study"

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Date of publication: 11/12/2023
DOI 10.5281/zenodo.18861306

Abstract:
Background: Post-stroke dysphagia is a frequent and serious complication that contributes to aspiration pneumonia, malnutrition, dehydration, prolonged hospitalization, and reduced quality of life. Early nurse-led swallowing rehabilitation has been recognized as an essential component of stroke recovery.
Objective: To determine the effectiveness of a structured swallowing exercise package on swallowing ability and quality of life among post-stroke patients with dysphagia.
Methods: A quasi-experimental pre-test post-test control group design was adopted. A total of 200 post-stroke patients diagnosed with dysphagia were recruited using purposive sampling and allocated into experimental (n=100) and control (n=100) groups. Swallowing ability was assessed using the Gugging Swallowing Screen (GUSS), and quality of life was measured using the SWAL-QOL questionnaire. The experimental group received a structured swallowing exercise package for 30 minutes daily for four weeks along with routine care, whereas the control group received routine care alone. Data were analyzed using descriptive statistics, paired t-test, and independent t-test.
Results: The experimental group showed statistically significant improvement in swallowing ability (Pre: 9.72 ± 2.01; Post: 14.85 ± 1.68; $t = -29.41$, $p < 0.001$) and quality of life (Pre: 45.26 ± 7.84; Post: 66.12 ± 6.95; $t = -32.88$, $p < 0.001$). Post-test comparison revealed significant differences between groups in GUSS ($t = 12.76$, $df = 198$, $p < 0.001$) and SWAL-QOL ($t = 11.94$, $df = 198$, $p < 0.001$).
Conclusion: The structured swallowing exercise package significantly enhanced swallowing function and quality of life among post-stroke patients. The study highlights the importance of nurse-led rehabilitation in stroke management.

Keywords: Dysphagia, Stroke Rehabilitation, Nursing Intervention, Swallowing Exercises, Quality of Life

Introduction

Stroke is a critical medical condition that remains a leading cause of mortality and long-term disability worldwide. Each year, approximately 13.7 million strokes occur globally, making stroke the second most common cause of death, responsible for 5.7 million fatalities.(Banda et al., 2022)

Stroke is one of the leading causes of acquired disability across the world today, with the number of people living with stroke-related disability continuing to grow. Dysphagia is a major complication following an acute stroke that affects the majority of patients. Post-stroke dysphagia (PSD) is present in more than 50% of acute stroke patients, increases the risk of complications, in particular aspiration pneumonia, malnutrition and dehydration, and is linked to poor outcome and mortality. (Dziewas et al., 2021)

Swallowing rehabilitation exercises offer functional benefits for older adults with dysphagia. Specific exercises target different aspects of swallowing physiology. A combination of swallowing rehabilitation exercises tailored to individual needs may provide superior functional outcomes compared to isolated interventions.(Chen et al., 2023)

Nurses play a critical role in early detection, assessment, monitoring, and rehabilitation of dysphagia. Evidence-based swallowing exercises strengthen oropharyngeal muscles, enhance coordination, and promote neural plasticity. However, structured and standardized nurse-led swallowing

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exercise protocols are not consistently implemented in many clinical settings.(Yang et al., 2023)

Problem Statement

"An experimental study to evaluate the effectiveness of interventional swallowing exercise
package on swallowing ability and quality of life among post-stroke patients with dysphagia in
Narayan Medical College and Hospital, Rohtas Bihar".

Objectives of the Study

1. To assess the pre-intervention level of swallowing ability and quality of life among post-stroke patients with dysphagia in both experimental and control groups.
2. To determine the effectiveness of the structured swallowing exercise package on improving swallowing ability and quality of life among post-stroke patients in the experimental group.
3. To compare the post-intervention swallowing ability and quality of life scores between the experimental and control groups.

Research Hypotheses: The following hypotheses were formulated for statistical testing at 0.05 level of significance:

H1: There will be a significant difference between pre-test and post-test swallowing ability scores among post-stroke patients in the experimental group.

H2: There will be a significant difference between pre-test and post-test quality of life scores among post-stroke patients in the experimental group.

H3: There will be a significant difference in post-test swallowing ability scores between experimental and control groups.

H4: There will be a significant difference in post-test quality of life scores between experimental and control groups.

Operational Definitions

1. **Quasi-Experimental Study:** A research design with experimental and control groups without randomization to assess intervention effectiveness.
2. **Effectiveness:** Significant improvement in swallowing ability and quality of life following the structured swallowing exercise package, measured by GUSS and SWAL-QOL.
3. **Structured Swallowing Exercise Package:** A nurse-supervised set of evidence-based swallowing exercises administered for 30 minutes daily for four weeks.
4. **Swallowing Ability:** The ability to safely swallow without aspiration, assessed using GUSS scores.
5. **Quality of Life:** Swallowing-related physical, emotional, and social well-being measured by SWAL-QOL.
6. **Post-Stroke Patients:** Individuals diagnosed with ischemic or hemorrhagic stroke confirmed clinically and radiologically.
7. **Dysphagia:** Swallowing difficulty resulting from stroke-related neurological impairment.

Assumptions

1. Post-stroke dysphagia patients can improve swallowing through structured exercises.
2. Supervised exercises enhance neuromuscular coordination and neural plasticity.
3. Improved swallowing enhances quality of life.
4. Participants respond honestly to SWAL-QOL.
5. GUSS and SWAL-QOL are valid and reliable tools.
6. Nurses adhere to the exercise protocol.

Delimitations

1. Post-stroke patients diagnosed with ischemic or hemorrhagic stroke.
2. Included conscious patients with clinical dysphagia able to follow instructions.
3. Limited to 200 participants (100 experimental, 100 control).
4. Conducted in selected hospitals, limiting generalizability.
5. Intervention duration restricted to four weeks.
6. Outcomes limited to GUSS and SWAL-QOL measures.
7. Excluded patients with severe cognitive impairment, unstable conditions, or prior swallowing therapy.

I. Materials and Methods

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Research Design: A quasi-experimental pre-test post-test control group design was adopted to evaluate intervention effectiveness.

Setting: The study was conducted in neurology and rehabilitation units of selected Narayan Medical College and Hospital, Jamuhar, Rohtas Bihar.

Sample and Sampling Technique: A total of 200 post-stroke patients with clinically confirmed dysphagia were selected using purposive sampling.

- Experimental group: 100 participants
- Control group: 100 participants

Variables of the Study:

1. Independent Variable

Structured Swallowing Exercise Package: This refers to the nurse-administered intervention consisting of evidence-based swallowing exercises conducted for 30 minutes daily for four weeks.

2. Dependent Variables

a) Swallowing Ability: The functional capacity of post-stroke patients to swallow safely, measured using the **Gugging Swallowing Screen (GUSS)**.

b) Quality of Life: The perceived physical, emotional, and social well-being related to swallowing difficulties, measured using the **SWAL-QOL** questionnaire**.**

Inclusion Criteria

1. Patients diagnosed with either ischemic or haemorrhagic stroke confirmed by clinical and radiological evaluation.
2. Patients with clinical evidence of dysphagia as assessed by standardized swallowing assessment tools.
3. Patients who were conscious, oriented, and able to understand and follow verbal instructions.
4. Patients who expressed willingness to participate and provided informed consent.

Exclusion Criteria

1. Patients with severe cognitive impairment that interfered with their ability to comprehend instructions or actively participate in the intervention.
2. Patients with unstable medical conditions such as hemodynamic instability, severe respiratory distress, or other acute complications requiring intensive medical management.
3. Patients who had previously undergone structured swallowing therapy or rehabilitation prior to enrollment in the study.

Research Tools: Data were collected using the following standardized tools:

Section A - Demographic and Clinical Data Sheet: A structured demographic and clinical data sheet was developed by the researcher. The tool included variables such as Age, Gender, Educational status, Marital status, Occupation, Type of stroke, Duration since stroke, Comorbidities (e.g., hypertension, diabetes) & History of hospitalization.

Section B – Tool 1 : Gugging Swallowing Screen (GUSS) consists of: Indirect swallowing test and Direct swallowing test (semi-solid, liquid, and solid consistencies). The total score ranges from 0 to 20 (0–9: Severe dysphagia, 10–14: Moderate dysphagia, 15–19: Mild dysphagia and 20: No dysphagia). Higher scores indicate better swallowing function and lower risk of aspiration.

Section B – Tool 2 : SWAL-QOL Questionnaire (Swallowing Quality of Life) is a standardized self-report instrument designed to assess the impact of dysphagia on physical, emotional, and social domains. The Scores are transformed to a 0–100 scale, where Higher scores indicate better quality of life and Lower scores indicate greater impairment.

Results

Variable	Group	Pre-Test Mean ± SD	Post-Test Mean ± SD	t	df	p
GUSS	Experimental	9.72 ± 2.01	14.85 ± 1.68	−29.41	99	<0.001

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GUSS	Control	10.05 ± 2.12	11.02 ± 1.95	−6.12	99	<0.001
SWAL-QOL	Experimental	45.26 ± 7.84	66.12 ± 6.95	−32.88	99	<0.001
SWAL-QOL	Control	46.01 ± 8.12	51.43 ± 7.55	−8.94	99	<0.001

Table 1: Within-Group Comparison (Paired t-Test)

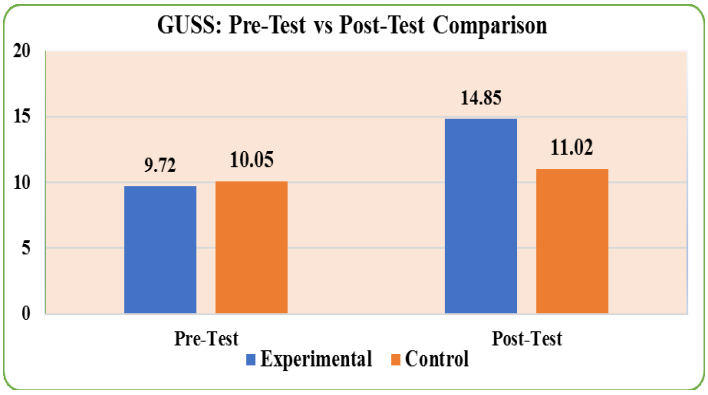

Figure 1: Swallowing Ability GUSS: Pre-Test vs Post-Test Comparison

Figure 1 - Represents that the experimental group demonstrated a significant improvement in swallowing ability, with mean scores increasing from **9.72 ± 2.01** (pre-test) to **14.85 ± 1.68** (post-test) (**t = −29.41, p < 0.001**), indicating strong intervention effectiveness. In contrast, the control group showed a smaller improvement from **10.05 ± 2.12** to **11.02 ± 1.95** (**t = −6.12, p < 0.001**), with a comparatively lower magnitude of clinical change.

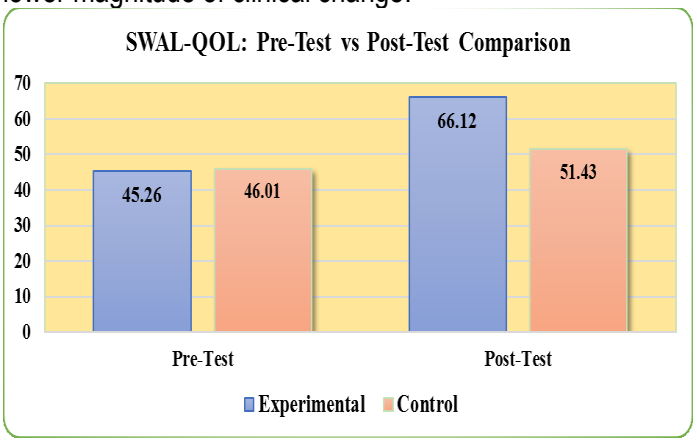

Figure 2: Quality of Life (SWAL-QOL) : Pre-Test vs Post-Test Comparison

Figure 2 – Represents that the experimental group showed substantial improvement in quality of life, with mean scores increasing from **45.26 ± 7.84** to **66.12 ± 6.95** (**t = −32.88, p < 0.001**), indicating a strong intervention effect. In contrast, the control group demonstrated only modest improvement from **46.01 ± 8.12** to **51.43 ± 7.55**, with comparatively smaller clinical change.

Table 2: Between-Group Comparison (Independent t-Test – Post-Test)

Variable	Experimental Mean ± SD	Control Mean ± SD	t	df	p
GUSS	14.85 ± 1.68	11.02 ± 1.95	12.76	198	<0.001
SWAL-QOL	66.12 ± 6.95	51.43 ± 7.55	11.94	198	<0.001

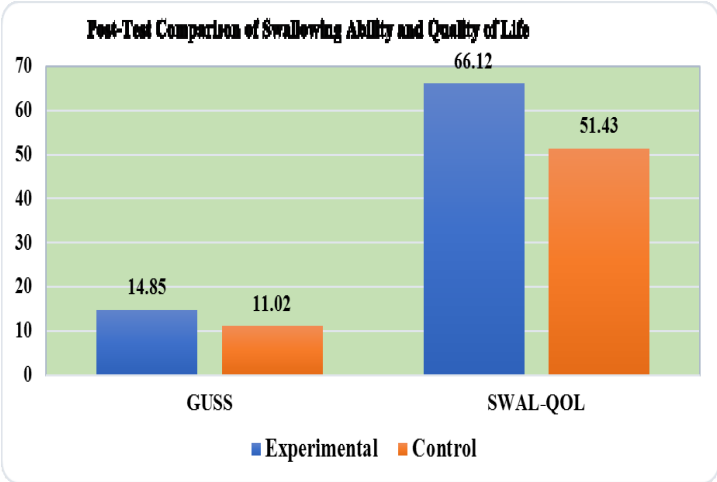

Figure 3: Between-Group Comparison of Swallowing Ability and Quality of Life

Figure 3 – Represents that the post-test mean GUSS score was significantly higher in the experimental group (**14.85 ± 1.68**) compared to the control group (**11.02 ± 1.95**) (**t = 12.76, df = 198, p < 0.001**), indicating that the structured swallowing exercise package was more effective than routine care in improving swallowing ability.

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Similarly, the post-test mean SWAL-QOL score was significantly greater in the experimental group (**66.12 ± 6.95**) than in the control group (**51.43 ± 7.55**) (**t = 11.94, df = 198, p < 0.001**), demonstrating superior improvement in quality of life among participants receiving the intervention.

Discussion

Since the obtained p-values are less than the 0.05 level of significance, the null hypotheses were rejected. There is strong statistical evidence that the structured swallowing exercise package significantly improved both swallowing ability and quality of life among post-stroke patients with dysphagia. The findings of this study confirm that structured swallowing exercises significantly enhance swallowing function and quality of life among post-stroke patients. The marked improvement in GUSS scores suggests restoration of swallowing safety and reduced aspiration risk.

Nursing Implications

Nursing Practice :

- Routine dysphagia screening should be implemented in stroke units.
- Structured swallowing exercise protocols should be integrated into nursing care plans.

Nursing Education :

- Curriculum enhancement to include advanced dysphagia management training.
- Simulation-based learning modules for swallowing assessment techniques.

Nursing Administration :

- Development of standardized swallowing rehabilitation protocols.
- Interdisciplinary collaboration between nurses, neurologists, and speech therapists.

Nursing Research :

- Further exploration of innovative swallowing rehabilitation techniques.
- Evaluation of cost-effectiveness of structured interventions.

Limitations

- Quasi-experimental design without randomization.
- Conducted in selected hospitals limiting generalizability.
- Short duration of follow-up.
- Reliance on self-reported quality-of-life measures.

Recommendations : Based on the findings, the following recommendations are proposed:

- Conduct randomized controlled trials to strengthen evidence.
- Undertake long-term follow-up studies to evaluate sustained outcomes.
- Implement multicenter studies to improve generalizability.
- Compare structured swallowing exercises with alternative rehabilitation methods.
- Develop national guidelines for nurse-led dysphagia management.

Conclusion

The present study concludes that the structured swallowing exercise package was highly effective in improving swallowing ability and enhancing quality of life among post-stroke patients with dysphagia.

The intervention demonstrated:

- Significant improvement in functional swallowing outcomes
- Reduction in dysphagia severity
- Enhanced psychosocial well-being
- Overall improvement in health-related quality of life

The study supports the integration of nurse-led swallowing rehabilitation into standard stroke management protocols.

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