Review Journal of Social Psychology & Social Works
http://socialworksreview.com

ISSN-E: 3006-4724 **Volume**: 3
ISSN-P: 3006-4716 **Issue:** 2 (April - June, 2025)

Effectiveness of a Nurse-Initiated Oral Care Protocol in Reducing the Incidence of Aspiration Pneumonia among Hospitalized Stroke Patients

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Abstract

Existing research shows that aspiration pneumonia poses strong risks for stroke patients, mostly because they cannot maintain proper oral hygiene while dealing with dysphagia problems. The importance of oral care remains low within standard stroke management practices. Research demonstrates that nurse-led standardized treatment procedures decrease healthcare-associated infections such as pulmonary aspiration pneumonia through regular evidence-based practice application. This study evaluated a protocol for oral care implementation by nursing staff to determine its impact on reducing the incidence of pneumonia among stroke patients during hospitalization. The research used a pretest-posttest control group design format to conduct experiments at Saidu Teaching Hospital. The study included sixty stroke patients who received purposive selection methods followed by random distribution into two different groups consisting of thirty patients. The intervention group underwent planned oral care procedures using chlorhexidine cleansers with oral examinations and suctioning procedures, while the standard care procedures were provided to the control group. Research data on aspiration pneumonia occurrence and oral health scores measured in the participants at baseline and after seven days of intervention. SPSS version 26 served for statistical analysis, with $p<0.05$ establishing the significance threshold. The rates of aspiration pneumonia were lower in the intervention group at 10.0% compared to 36.7% in the control group, with an associated p-value of 0.012. Mean oral health scores in the intervention group increased substantially from 6.5 ± 1.1 to 2.1 ± 0.9 ($p<0.001$), although the control group did not experience any major change. The results validate that stroke patients benefit from nurse-delivered oral care protocols, which decrease their chance of developing aspiration pneumonia. Medical authorities should adopt nurse-led oral care protocols as standard practice in nursing operations.

***Keywords*:** Aspiration Pneumonia, Oral Care, Stroke Patients, Nurse-Led Intervention, Hospital-Acquired Infections, Nursing Protocol, Patient Safety

Introduction

Food and liquid substances, along with saliva and vomit, can enter the wrong passage when swallowing improperly, which triggers the severe medical condition known as aspiration pneumonia (Murry et al., 2020). The condition mostly affects individuals with neurological damage, including stroke patients, because their swallowing defense mechanisms are impaired and their awareness levels are reduced. The sudden blockage of brain blood flow after a stroke creates functional disabilities that typically affect swallowing ability (Lerner & Tan, 2024). Oral care is a practice that preserves oral hygiene through dental and gum care, as well as mouth and tongue cleaning to stop infections. A nurse-initiated protocol represents a methodical intervention registered nurses create and conduct autonomously within their authorized clinical nursing practices (Barnett et al., 2022). Stroke victims experience a consistently high occurrence of aspiration pneumonia, according to recorded data that shows similar incidence from 5% to 50% across various patient groups and clinical environments (Castner & Boris, 2020). The American Stroke Association reports that stroke survivors face double the risk of aspiration pneumonia because dysphagia affects 65% of this population (Lidetu et al., 2023). A stroke-induced pneumonia creates recovery challenges, results in prolonged hospitalizations, and increases healthcare expenses and mortality statistics. Developing nations hide a higher true stroke burden because they lack sufficient diagnostic testing methods, and their prevention strategies are unreliable. The lack of reliable preventive care methods for post-stroke patients has become an urgent necessity (Assefa et al., 2022).

Maintaining good oral hygiene is essential for preventing aspiration pneumonia among patients who need help with oral care. Subjects with limited food intake through the mouth or who receive tube feeding often contain dangerous microorganisms in their oral cavity that can penetrate through inhalation into the lungs (Eltringham et al., 2020). The consistent delivery of oral healthcare remains secondary to other hospital priorities while receiving infrequent attention in healthcare institutions. Studies prove that regular oral hygiene reduces bacterial infection levels, thus minimizing the risk of pulmonary infections (Khadka et al., 2021). A standardized approach to oral hygiene during nursing care of stroke patients represents an efficient method to stop pneumonia development (Scannapieco, 2023). The constant patient contact and monitoring duties of nurses create an ideal position to carry out preventive measures such as oral care at healthcare settings. The early warning detection done by nurses of aspiration, coupled with quick responses, can effectively minimize complication risks (Nakagawa et al., 2020). Nurses with evidence-based protocols and proper training can develop patient-specific oral care regimens for high-risk patients, thus leading to their implementation and maintenance. The delivery of adequate oral care remains insufficient throughout numerous hospitals because healthcare organizations lack standardized hospital-wide protocols, together with inadequate training of nursing staff (Vaismoradi et al., 2020).

Healthcare facilities with few medical resources typically implement unstandardized oral care procedures (Kwame & Petrucka, 2021). Current guidelines do not address the barriers that healthcare staff experience, such as short staffing, constraints, or budget limitations when delivering oral care to patients (Rathnayake et al., 2021). Minimal levels of collaboration exist between nursing staff, physicians, and speech therapists when it comes to preventing aspiration incidents (Vledder et al., 2025). Literature lacks sufficient research about the effect of nurse-developed oral care procedures for reducing aspiration pneumonia among stroke patients who do not require intubation. However, this topic demands specific scholarly examination (Perry et al., 2024). Hospital studies of intensive care units have proven that standardized oral care procedures decrease ventilator-associated pneumonia rates, and this evidence implies comparable preventative

measures should work in non-intensive care rooms (Moss, 2025). Such interventions applied to stroke care units show potential to improve patient outcomes by using basic and affordable nursing interventions (Wirth, 2024). To deliver consistent, high-quality preventive care to all hospital patients, nurses need to follow standardized oral care protocols, producing safer hospital conditions and better outcomes for stroke survivor recovery (Gershonovitch et al., 2020). Research aims to determine whether a nurse-led oral care procedure will decrease pneumonia occurrence in stroke patients receiving hospital care, since pneumonia can be prevented (Sánchez Peña et al., 2021). The study develops and monitors this protocol to create useful guidelines that enhance clinical procedures, lower complication occurrences, and strengthen evidence-based nursing methods. The research findings will design of new policies and training initiatives that make oral care an established procedure during post-stroke nursing care.

Methodology

Researchers used pretest-posttest control group evaluation in a quasi-experimental framework to determine the effectiveness of a nurse-developed oral care strategy in minimizing stroke patients' risk of developing aspiration pneumonia during hospitalization. The research design enabled standard versus nurse-led care analysis while ensuring ethical clinical feasibility for the study.

Researchers conducted this research project in the Saidu Teaching Hospital medical wards. The study included 60 patients who received a stroke diagnosis within 48 hours of admission through purposive sampling. Adult stroke patients aged 40 or older who demonstrated an elevated risk of aspiration due to assessment by speech and language pathologists were qualified for inclusion. Individuals who presented with active pneumonia, used mechanical ventilation or possessed oral cancer or suffered injuries were eliminated from the study.

Research included two participants groups randomly distributed into the intervention group (n=30) and the control group (n=30). Nurses in the control group delivered normal care by providing standard oral hygiene without any structured procedures. Nurses provided oral care to the intervention group using a protocol that followed evidence-based guidelines. The oral care protocol involved daily chlorhexidine cleanings twice per day, together with select oral health evaluations through checklists and oral suction procedures coupled with detailed care documentation. Nurses received protocol training before study implementation during workshops that lasted two days, including demonstrations and practice supervision.

Data Collection Procedure

A team of nurses used tools that included demographic and clinical data sheets, oral health assessment checklists, and aspiration pneumonia diagnostic forms developed from CDC criteria during data collection. Research data collection occurred initially before intervention started and again after 7 days, when the care protocols began. Diagnosis of aspiration pneumonia incidence required a physician who did not know the study group assignments to examine clinical signs, chest x-ray findings, and laboratory tests.

Data Analysis Procedure

The SPSS software version 26 enabled the analysis of collected data. The descriptive statistical measures, including mean, standard deviation, alongside frequency and percentage, provided a summary of demographic and clinical data. The comparison between intervention and control groups regarding aspiration pneumonia incidence used chi-square tests for inferential analysis. A statistical significance appeared with p-values below 0.05.

Ethical Considerations

Before conducting this research, the Institutional Review Board of Saidu Teaching Hospital provided its ethical approval. The research obtained consent from all participants and their

authorized guardians. The research phase maintained strict protections for confidentiality, together with anonymity. Every participant received a guarantee that their departure from the study would result in no negative effects on the medical services they received.

Results and Analysis

Demographic and Clinical Characteristics of Participants.

All participating subjects had matching essential qualities at their starting point. The participants in both groups had very close average ages: 68.3 for the intervention group and 67.8 for the control group. The distribution of stroke types and gender composition between the two study groups remained almost equal. The initial oral health evaluations demonstrated equal results between groups to maintain equitable assessment conditions (Table 1).

Table 1: Demographic and Clinical Characteristics of Participants

Characteristic	Intervention Group (n=30)	Control Group (n=30)
Age (years), Mean ± SD	68.3 ± 9.1	67.8 ± 8.6
Gender, n (%)		
Male	16 (53.3%)	14 (46.7%)
Female	14 (46.7%)	16 (53.3%)
Stroke Type, n (%)		
Ischemic	22 (73.3%)	20 (66.7%)
Hemorrhagic	8 (26.7%)	10 (33.3%)
Baseline Oral Health Score (Mean ± SD)	4.2 ± 1.5	4.0 ± 1.3

Incidence of Aspiration Pneumonia after 7 Days

The intervention group experienced less than half (10.0%) of patients with aspiration pneumonia compared to the control group at 36.7%. The intervention group suffered aspiration pneumonia in three cases, while the control group reported eleven instances. The statistical analysis confirmed this difference as significant with a p-value of 0.012. Evidence shows the nurse-developed oral care approach decreased the occurrence of pneumonia. (Table 2).

Table 2: Incidence of Aspiration Pneumonia after 7 Days

Group	Aspiration Pneumonia Cases (n)	No Pneumonia Cases (n)	Total (n)	Incidence Rate (%)	p-value
Intervention	3	27	30	10.0%	0.012
Control	11	19	30	36.7%	

Pre and Post Intervention

During seven days, the intervention group students demonstrated major improvement in oral health through their mean score reduction from 6.5 to 2.1 ($p < 0.001$). The control group participants demonstrated minimal non-significant changes in their scores between 6.3 and 5.9 ($p = 0.22$). The protocol applied by nurses significantly improved oral hygiene according to measurement results. The research results validate the importance of using a standardized oral hygiene protocol for stroke patients during hospital stays. (Table 3).

Table 3: Mean Oral Health Scores Pre and Post Intervention

Group	Mean Oral Health Score (Baseline ± SD)	Mean Oral Health Score (Day 7 ± SD)	p-value (Within Group)
Intervention	6.5 ± 1.1	2.1 ± 0.9	**< 0.001**
Control	6.3 ± 1.3	5.9 ± 1.2	0.22

Discussion

The research findings show that establishing nurse-led oral care procedures decreased hospital-acquired aspiration pneumonia infections in stroke patients. The data confirms that nurse-led oral health monitoring systems, which provide standardized oral care to medically sensitive patients, decrease their respiratory complications effectively. Aspiration pneumonia rates were significantly reduced among participants in the intervention group, where the rates dropped to 10.0%, while the control group experienced 36.7% aspiration pneumonia cases, demonstrating the crucial role of dental hygiene during stroke recovery (Sánchez Peña et al., 2021).

The established findings from prior research demonstrate that stroke patients struggle with respiratory infections when their oral health remains poor. El-Solh et al. (2004) showed that dental plaque and respiratory pathogen colonization in the oropharynx act as a primary pneumonia risk factor for elderly patients in hospitals. According to Zheng et al., (2023), standard oral cleaning practices led to lower bacterial growth in the mouth regions, lowering the risk of aspiration pneumonia occurrences. According to our research findings and existing evidence, standardized oral care procedures led by nurses can serve as a preventive measure (Lawal & Omara, 2023). Contrary to previous research, which primarily studied dental professionals and caregiver oral care, this research demonstrates that nurse-led interventions successfully improve oral care in clinical practice. The results indicate that nurses who receive standardized oral care training yield practical and economical solutions to enhance patient success in low-resource clinical settings. The use and systematic documentation in this research environment seem to increase compliance rates and overall patient care quality (Santos et al., 2021).

Studies produced different results due to evidence that showed therapy focused on oral health does not decrease pneumonia rates effectively. The research by Khadka et al., (2021) demonstrated that regular oral care for patients provided minimal protection against pneumonia unless it included professional cleaning or consistent implementation. The research inconsistency may stem from irregular oral care procedures and varying frequencies of care delivery and care provider types. The present research tried to resolve these problems by implementing nurse training sessions linked to adherence tracking (Chebib et al., 2021). The subjects in the intervention group who received treatment achieved better oral health scores than the control group, who experienced no change during the seven-day observation period (Zimmerman et al., 2020). Because of these findings, effective oral assessment techniques combined with proper hygiene care have become possible for nurses. Zhang et al., (2020) reported that structured oral care procedures improved oral health results and reduced infections among ICU patients.

Our study supports the effectiveness of nurse-led oral care. Still, we need to address its limitations through the quasi-experimental setup and small study participant count that reduces the widespread applicability of our results. The important differences between the intervention and control groups show noticeable clinical benefits.

Conclusion and Recommendations

Research evidence proves that a nursing-developed oral care protocol successfully decreases aspiration pneumonia frequency in hospitalized patients with stroke. This investigation demonstrates that nurses are essential in developing structured, evidence-based oral hygiene care methods that directly benefit patients. Patients who received the intervention protocol showed reduced aspiration pneumonia occurrence and improved oral health scores, which validated its usefulness in hospital care. Oral care should become a mandatory standard practice in stroke management because research has confirmed its value during periods when patients suffer from respiratory complications due to swallowing problems and reduced mental state.

According to study results, Hospital administrators and nursing leadership should initiate policies for nurse-conducted oral care protocols across stroke units and medical wards. Regular training sessions for nurses will maintain their capability to provide excellent oral care practices. The institution should develop continuous tracking systems that monitor adherence to the protocol and assess areas that need improvement. Additional extensive randomized controlled trials need to be conducted to verify these research findings and examine oral care protocol involvement in the long-term patient recovery process and healthcare expenses. Including oral healthcare within the stroke care delivery system will boost patient protection, lower nosocomial pathogen infections, and result in superior health outcomes.

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