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Study on Personalized Dysphagia Prevention Strategies for the Elderly in Nursing Homes Based on Swallowing Function Assessment

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Abstract: Against the backdrop of population aging, frequent dysphagia incidents among the elderly in care facilities constitute a significant safety risk. This study systematically analyzes the definition of dysphagia in the elderly, its risk factors, and the limitations of existing risk assessment tools, proposing a personalized prevention strategy framework centered on dynamic swallowing function evaluation. This framework employs a three-tiered assessment protocol to accurately identify dysphagia and implements stratified management interventions based on severity (mild, moderate, and severe). It encompasses formulating individualized dietary plans, targeted swallowing rehabilitation training, psychological interventions, and specialized training for nursing staff, complemented by tiered emergency protocols. This strategy integrates multidimensional factors—physiological, psychological, environmental, and care-related—providing a pathway for care facilities to establish a standardized, actionable dysphagia risk management protocol, thereby reducing dysphagia incidence and enhancing the quality of life and safety assurance for the elderly.

1. Introduction

With the accelerating global aging trend, elderly care facilities are playing an increasingly critical role in providing daily life support for older adults. Due to the decline in physiological functions, the gradual deterioration of swallowing capacity among the elderly increases their vulnerability to dysphagia during meals, making dysphagia a significant threat to both their safety and quality of life. As congregate settings for older populations, care facilities represent high-risk environments for dysphagia incidents and subsequent suffocation[1]. Consequently, developing effective strategies to prevent dysphagia among institutionalized elderly has become an urgent priority in the field of elder care services. Establishing assessment tools tailored for identifying swallowing disorders in this population, early recognition of high-risk individuals, and constructing standardized early intervention protocols may reduce the incidence of swallowing impairments in residential care settings[2]. This study aims to establish a personalized dysphagia prevention strategy

system for elderly care facilities based on swallowing function assessment, thereby providing evidence-based references to mitigate dysphagia incidents, enhance quality of life, and safeguard the well-being of institutionalized older adults.

2. Definition of Dysphagia in the Elderly, Risk Factors, and Assessment of Swallowing Function

2.1. Definition of Dysphagia

Dysphagia, also known as airway obstruction by food, refers to the blockage of the glottis or trachea by food, leading to asphyxia. If the blockage causes partial narrowing of the airway, the patient exhibits frequent or persistent, violent coughing. If dysphagia results in complete airway obstruction, the patient often manifests severe dyspnea, the three depressions sign, cyanosis, and other ominous signs of asphyxia. It is one of the common causes of sudden death in the elderly[1]. Relevant studies indicate that the incidence of dysphagia is higher among adults over 75 years old, and the risk increases with advancing age. Fatal dysphagia can occur at any stage, but approximately 75% of cases occur during old age[3].

2.2. Risk Factors for Dysphagia in the Elderly

The occurrence of dysphagia in the elderly may be associated with physiological factors, pathological factors, pharmacological factors, dietary and habitual factors, as well as factors related to healthcare personnel and family members[3].1) Physiological Factors: Senile mucosal atrophy and muscular degeneration in the pharynx and esophagus contribute to dysphagia, which impairs mastication and often results in hasty swallowing, food retention, and even esophageal obstruction[4].2) Pathological Factors: Conditions such as intellectual disability, dementia, schizophrenia, mood disorders, epilepsy-related mental disorders, and cerebrovascular diseases [5] frequently cause diminished swallowing reflexes, predisposing individuals to dysphagia.3) Pharmacological Factors: Side effects of medications prescribed for mental disorders can induce dysfunction of the pharyngeal muscle groups and suppress the swallowing reflex. Additionally, these medications may cause intense hunger sensations, leading to psychiatric symptoms such as impaired satiety perception, uncontrolled eating, food grabbing, and ultimately acute esophageal obstruction and dysphagia.4) Dietary Habit Factors: These encompass a history of smoking, preference for food at extreme temperatures, consumption of dry or large food pieces, hyperphagia, food grabbing, taking large bites while eating, and inattention during meals[3].5) Healthcare Personnel and Family Factors: Medical staff and family members often exhibit insufficient attention to the dysphagia risks in older adults, resulting in inadequate supervision during mealtimes. Health education has proven ineffective, with low family compliance and failure to adhere to the hospital's centralized food management system. Additionally, the assisted feeding practices in nursing homes constitute an important factor contributing to the occurrence of dysphagia among elderly individuals[6-7].

2.3. Assessment of Swallowing Function in Older Adults at Elderly Care Institutions

Dysphagia is closely associated with swallowing dysfunction, making clinical swallowing assessment essential for dysphagia risk evaluation. The Kubota Water Drinking Test is widely used in China for screening [8], which grades performance after drinking 30 mL warm water while seated [9]. For imaging evaluations, videofluoroscopic swallowing study and ultrasound are common options[10]; however, the former is invasive and costly, whereas the latter has low sensitivity in

detecting aspiration, thus selection should be based on clinical context. The Functional Oral Intake Scale (FOIS)[11], developed to assess swallowing function based on dietary intake levels, is also extensively applied in China[12].

3. Development of Personalized Prevention Strategies Based on Swallowing Function Assessment

3.1. Personalized Assessment Process

3.1.1. Admission Assessment

Conducting a comprehensive swallowing function assessment for elderly individuals newly admitted to residential care facilities is essential. This admission assessment enables nursing staff to understand the resident's swallowing functional status and provides the basis for formulating personalized care plans and dietary regimens[1]. The admission assessment includes questionnaires, clinical observation, and instrumental examinations such as the Water Swallow Test and EAT-10, to evaluate self-reported swallowing function, medical history, and clinical feeding performance. A personal swallowing function profile is subsequently established, documenting assessment outcomes, medical history, and dietary preferences. This profile serves as a reference for subsequent periodic and dynamic evaluations, enabling nursing staff to promptly monitor changes in swallowing function.

3.1.2. Periodic Assessment

Regular assessment of swallowing function in older adults is essential for ensuring the effectiveness of personalized preventive strategies and enables continuous monitoring of dysphagia. It is recommended that nursing institutions implement periodic evaluations, typically every 3 to 6 months, to promptly detect functional changes and initiate interventions. The assessment content is similar to the initial admission evaluation, encompassing questionnaires, clinical observation, and instrumental examinations.

3.1.3. Dynamic Assessment

Dynamic assessment, conducted during clinical changes, treatment, or rehabilitation, should also include the evaluation of psychological status, such as mealtime emotion and satisfaction, with frequency determined based on individual conditions. Methods encompass questionnaires, clinical observation, and instrument-based examinations.

3.2. Development of Personalized Dietary Plans

3.2.1. Grading Based on Swallowing Function Assessment Results

Assessment and classification of swallowing function in older adults, followed by the formulation of personalized dietary plans based on the severity level, are crucial for ensuring nutritional safety[13]. Using Japanese rehabilitation-based scoring criteria, swallowing function can be assessed three times per week and classified into mild, moderate, and severe grades[14]. ndividuals with mild impairment may experience slight difficulty with certain foods but can generally eat normally; those with moderate impairment require modification of food texture and feeding strategies; whereas severe cases often necessitate alternative feeding methods such as nasogastric tube or gastrostomy feeding.

3.2.2. Dietary Regimens Tailored to Different Levels of Dysphagia

(1) Dietary Regimen for Elderly Individuals with Mild Dysphagia

Dietary regimens should focus on modifying food texture and type. For elderly individuals with good digestive function, intake of lean meat, fish, and eggs should be appropriately increased, as these provide high-quality protein, unsaturated fatty acids, and vitamins [15]. Soft and semi-liquid foods (e.g., noodles, steamed egg custard, porridge) are recommended, while hard, dry, or indigestible items should be avoided. Thorough chewing during meals should be encouraged.

(2) Dietary Regimen for Elderly Individuals with Moderate Dysphagia

Foods require more refined modification, being processed into pureed or paste-like consistencies to facilitate swallowing. During feeding, specialized utensils, such as adaptive spoons or straws, may be used to control feeding speed and bolus size. Additionally, personalized dietary plans can be formulated based on the individual's taste preferences and nutritional requirements.

(3) Dietary Regimen for Elderly Individuals with Severe Dysphagia

For elderly individuals with severe dysphagia, enteral nutrition via nasogastric tube feeding or gastrostomy/jejunostomy tube feeding is necessary. Nasogastric tube feeding involves inserting a tube through the nasal passage into the stomach for direct nutrient delivery. Gastrostomy/jejunostomy tube feeding involves the surgical creation of an abdominal stoma to establish a direct conduit into the gastrointestinal tract for nutrient infusion. Strict adherence to operational protocols is mandatory during tube feeding administration to ensure nutritional adequacy, balanced formulation, and food safety/hygiene.

3.2.3. Implementation and Supervision of Dietary Plans

The effective implementation of dietary plans requires close collaboration and supervision by nursing staff. Through observation during meals and swallowing tests, caregivers should assess swallowing function to develop individualized feeding plans and nursing care strategies[16]. Elderly care institutions must adjust the dining environment, food textures, and adaptive utensils based on residents' actual conditions to provide appropriate dining conditions [13].Nursing staff should receive professional training in proper feeding techniques. During feeding, close monitoring of swallowing is essential; any abnormalities should prompt immediate cessation and appropriate intervention[17]. A monitoring mechanism must be established to regularly evaluate the dietary plan's efficacy. Adjustments should be made promptly if issues are identified to ensure adequate nutrition and safe ingestion. Finally, continuous optimization of the dietary plan through data collection, evidence-based verification, and outcome evaluation is crucial to enhancing nutritional safety for the elderly[13].

3.3. Personalized Nursing Interventions

3.3.1. Swallowing Function Training

(1) Significance of Swallowing Function Training: Based on swallowing function grades in older adults, personalized training regimens are formulated to enhance flexibility and coordination of oral, pharyngeal, and cervical muscle groups, provide reflexive central nervous stimulation, promote neural network reorganization and collateral circulation establishment, prevent disuse atrophy, and mitigate swallowing function deterioration. For geriatric psychiatric patients, systematic swallowing assessment, graded dietary management, and staff training are essential to improve caregivers' competencies in recognition, assessment, and safety management of dysphagia[18].

(2) Methods of Swallowing Function Training: Swallowing function training encompasses oral motor exercises, swallowing reflex facilitation, and respiratory training. Oral motor exercises

enhance oral muscle strength through jaw opening/closing, tongue protrusion/retraction, and lateralization. Specific techniques include:1) Facial muscle training (frowning, cheek puffing, showing teeth, whistling, grimacing, jaw opening, lip smacking);2) Tongue muscle exercises (protruding tongue, pushing against cheeks, and circular movements);3) Soft palate training (tongue depressor assistance, ice swab stimulation, and vowel phonation to elevate soft palate) [3].Swallowing reflex training stimulates the pharynx to elicit swallowing, while respiratory training improves swallowing-respiration coordination.

(3) Precautions for Swallowing Function Training: The frequency, intensity, and duration of swallowing function training should be individually adjusted according to the specific condition of the elderly person. Generally, training is recommended three to five times per week, with each session lasting 20 to 30 minutes. The elderly individual's responses must be closely monitored during training; the session should be promptly discontinued if discomfort or pain occurs.

3.3.2. Psychological Care

Monitor the psychological status of elderly patients, promptly identifying and addressing emotional issues such as anxiety and depression [14]. Methods of psychological care include psychological counseling, communication, and music therapy. Nursing staff can engage in communication with elderly patients to understand their needs and feelings, providing care and support. Music therapy can alleviate tension in elderly patients by playing relaxing and pleasant music. Additionally, organizing social activities for elderly patients can enrich their lives and improve their psychological state. Reward systems may also be implemented upon completion of specific tasks, helping to alleviate psychological stress, enhance self-efficacy, and improve swallowing function[19].

3.3.3. Environmental Optimization

Improving the dining environment to ensure it is quiet, tidy, comfortable, spacious, bright, and clean for elderly individuals[6].[17]. To ensure safety and comfort for older adults during meals, lighting intensity should first be adjusted to provide sufficient and soft illumination for clear food identification, while table height and utensil placement ought to be properly arranged for easy access. Secondly, environmental noise should be controlled during mealtimes to minimize disruptive activities such as loud conversations; playing soft background music may help create a relaxing dining atmosphere.

3.3.4. Nursing Staff Training

To enhance nursing staff's competence in preventing swallowing disorders and dysphagia risks in older adults, a systematic training program should be implemented, covering swallowing function assessment, emergency techniques for dysphagia, formulation and implementation of individualized dietary plans, and swallowing rehabilitation strategies. .Monthly nursing safety meetings must be convened to conduct root-cause analyses of choking/asphyxiation incidents and propose improvements in nursing management. Refresher in-service training is required for personnel with insufficient knowledge or skills[1]. Additionally, regular emergency drills—including dysphagia rescue and protocol implementation—should be organized to improve emergency response and teamwork capabilities.

3.4. Development of Individualized Emergency Plans

3.4.1. Formulation of Emergency Plans Based on Swallowing Function Levels

Based on the swallowing function grades of elderly individuals, corresponding dysphagia emergency plans should be formulated, covering emergency response procedures, first aid methods, and staff responsibilities. For those with mild dysfunction, emphasis should be placed on early identification and basic first aid measures, with medical support summoned immediately if dysphagia persists. For moderate dysfunction, more detailed plans are required, including the preparation of suction devices and oxygen, along with clear protocols and duties to ensure a rapid and effective response. For severe dysfunction, considerations should include risks associated with special feeding methods such as nasogastric tube or gastrostomy feeding; feeding must be stopped immediately during dysphagia incidents while executing emergency measures, and a mechanism for urgent transfer to medical facilities should be established.

3.4.2. Emergency Drills and Training

Regular emergency drills shall be organized to enhance the emergency response capabilities and collaborative coordination of nursing staff. The methodology for conducting drills may involve initially establishing an emergency drill team. The implementation steps include learning and discussion, the drill execution itself, and analysis and summarization. Subsequent drills should then be conducted based on the analysis and conclusions drawn from the previous one[20]. Drill content may encompass simulated dysphagia scenarios, practical operation of first aid techniques, and the implementation of contingency plans. Through these drills, nursing staff can familiarize themselves with emergency procedures, thereby improving their ability to manage unexpected events. Concurrently, emergency knowledge training must be provided to elderly residents and their families to heighten their self-protection awareness and emergency response skills[21]. Training content may include dysphagia prevention methods, first aid techniques, and the contents of contingency plans. This training empowers elderly residents and their families to promptly take appropriate actions during dysphagia incidents, thereby buying critical time for treatment.

3.4.3. Emergency Resource Provision

It is essential to ensure that senior care facilities are equipped with necessary emergency medical devices and pharmaceuticals, such as suction devices, oxygen supplies, and emergency medications. These emergency devices and pharmaceuticals must undergo regular inspection and maintenance to guarantee their optimal functionality and adequate supply. A mechanism for urgent communication with medical institutions must be established to secure timely medical support in the event of a dysphagia incident. Senior care facilities should establish cooperative agreements with nearby hospitals and develop emergency referral protocols to ensure that elderly residents receive effective treatment within the shortest possible timeframe.

4. Conclusion

In conclusion, as societal aging accelerates, the incidence of dysphagia among the elderly is progressively increasing. The challenge of elderly dysphagia may become increasingly prominent within elderly care institutions. Nursing staff should enhance their recognition and prioritization of dysphagia risks, master techniques for dysphagia identification and emergency management, and ensure prompt detection and immediate resuscitation. In future healthcare and nursing management practices, it is also imperative to strengthen guidance for both the elderly themselves and their

family members. This guidance should focus on equipping them with knowledge of medical emergency procedures for dysphagia, formulating personalized dietary plans, implementing swallowing training programs, and intensifying observation and assistance during mealtimes. These measures will contribute to improving the self-care capabilities of the elderly, enhancing their quality of life, and supporting them in enjoying a secure and peaceful later life.

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