

# Implementation of a standardized out-of-hospital management method for Parkinson dysphagia

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## SUMMARY

**Objective:** Our objective is to explore the effectiveness and feasibility of establishing a swallowing management clinic to implement out-of-hospital management for Parkinson disease (PD) patients with dysphagia.

**Method:** Two-hundred seventeen (217) voluntary PD patients with dysphagia in a PD outpatient clinic were divided into a control group with 100 people, and an experimental group with 117 people. The control group was given dysphagia rehabilitation guidance. The experimental group was presented with the standardized out-of-hospital management method as overall management and information and education materials. Rehabilitation efficiency and incidence rate of dysphagia, as well as relevant complications of both groups were compared after a 6-month intervention.

**Results:** Rehabilitation efficiency and the incidence rate of dysphagia including relevant complications of patients treated with the standardized out-of-hospital management were compared with those seen in the control group. The differences have distinct statistics meaning ( $p < 0.01$ ).

**Conclusion:** Establishing a swallowing management protocol for outpatient setting can effectively help the recovery of the function of swallowing, reduce the incidence rate of dysphagia complications and improve the quality of life in patients with PD.

**Keywords:** Parkinson disease, swallowing disorders, ambulatory care.

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## INTRODUCTION

Parkinson disease (PD) is a degenerative disease of the nervous system. Lesions always involve the nerves and muscle of swallowing organs such as mouth, face, throat and esophagus, causing dysphagia. Dysphagia can lead to complications such as malnutrition, mis-inhalation, aspiration pneumonia, and is one of the main reasons for death, disability<sup>1,2</sup> and repeated hospitalization among PD patients. According to the literature, 35 to 80% of PD patients have dysphagia.<sup>3</sup>

To date, the pathogenesis of PD is not clear. At present, drug treatment and deep brain stimulation therapy are effective for improving PD patients' limb functions, but improvement of swallowing function is not clear and to date remains controversial.<sup>4-8</sup> In recent years, studies have shown that swallowing therapy machine has some effect on vascular Parkinson syndrome with dysphagia.

But it still needs to be further verified.<sup>4-9</sup> Gadenz et al.<sup>10</sup> applied transcranial magnetic stimulation to one patient with PD and dysphagia and one patient with Alzheimer disease and dysphagia. There was an effect on both of them.<sup>10</sup> But this therapy currently needs large-scale clinic tests. At present, many studies have shown that swallowing training may help coordinate PD patients' swallowing movement, and reduce the risks caused by dysphagia and improve the patients' life quality.<sup>11,12</sup>

Now, the world-recognized treatment method for Parkinson combines medical intervention and rehabilitation along with a concept of long-term comprehensive attention to the patient.<sup>13</sup> At present, remedial method is the main treatment for Parkinson in China. Rehabilitation is only carried out in some developed cities, with a few reports focusing on Parkinson dysphagia in hospitals alone.<sup>14</sup>

In February 2015, our department established a swallowing management clinic aimed at the features of PD patients with dysphagia and the existing difficulties in current therapy. Nurses specifically trained to improve the patients' swallowing function and PD outpatient doctors participated as a team to comprehensively manage and apply the standardized out-of-hospital management method for PD patients with dysphagia. The effect is remarkable. The report is as follows.

## METHOD

### Object

PD patients with dysphagia who sought the clinic were voluntarily divided into a control group and an experimental group. The control group had 100 people with an average age of  $69.3 \pm 11.3$  years; 59% were male. The experimental group had 117 people with an average age of  $71.4 \pm 12.7$  years, 60.6% being male. All of them met the diagnostic criteria for PD established by the UK Brain Bank. Dementia was ruled out through the mini-mental filter. Patients whose swallowing function is below level 3 were referred for hospitalization. PD patients presenting level 6-3 dysphagia were divided in two groups and displayed no distinct difference ( $p > 0.05$ ) (Table 1). Patients with background comorbidities such as high blood pressure, diabetes, coronary heart disease, surgical history and disease course showed no distinct difference ( $p > 0.05$ ) (Table 2).

**TABLE 1** Comparison of dysphagia between the control group and experimental group.

Groups	Control group	Experimental group
Level 6	11	15
Level 5	23	29
Level 4	53	58
Level 3	13	12

**TABLE 2** Comparison of patient characteristics between the control group and experimental group.

Groups	Control group	Experimental group
Average age	$69.3 \pm 11.3$	$71.4 \pm 12.7$
Male proportion	59 (59%)	71 (60.6%)
Disease course	$5 \pm 3.8$	$5 \pm 3.9$
Coronary heart disease	11 (11%)	18 (15%)
Diabetes	1 (1%)	0
High blood pressure	5 (5%)	9 (7.6%)
Surgical history	3 (3%)	4 (3.4%)

### Standardized out-of-hospital management intervention method

#### Long-term attention and overall management

- The establishment of a swallowing management clinic: Aimed to serve patients who have dysphagia caused by chronic or other diseases who cannot recover with short-term treatment inside the hospital, and need long-term rehabilitation and intervention outside the hospital.
- The establishment of swallowing archives: The clinic's nurses screen swallowing function of every PD patient who has seen a doctor at the clinic, and establish swallowing archives which include the patients' basic information/characteristics, specific diagnosis, relevant eating complaints, the results of swallowing function screening, dysphagia intervention strategy, health history, personal history, family history, contact information, reexamination time and method implementation courses, etc.
- Patients with swallowing problems should receive long-term attention and periodic re-examination. The different intervention strategies are applied according to the swallowing problems at different stages to make sure patients eat safely and receive enough nutrition.

#### Multimedia training combined with feedback method to raise awareness and educate

- The courses are designed by the swallowing team, they are easy to understand and carry out. The specialist provides theoretical training using a PPT. The contents are mainly about dangers caused by dysphagia and eating considerations. The skill training mainly presents oral muscle exercises, tongue muscle training exercises, pronunciation training, effective cough training, eating training and compensatory training with video and presentation.
- Both the patients and their families are subject to the course. The course lasts 30 m.
- After the training, a feedback step takes place to know how much information the patients and their families have mastered.

#### The training contents of out-of-hospital rehabilitation

According to their dysphagia screening results and function evaluation situation, grading and performance of dysphagia is determined and the targeted rehabilitation training is given.

Basic swallowing skill training is for patients with dysphagia in oral phasis as follows.

- Oral muscle exercises: lips shrinkage, tightening lips, pursing lips, bared teeth, maximizing mouth open,

closing mouth, taping teeth, cheek blowing and gargling training. Each exercise should be done 10 times every session, twice a day.

- Tongue muscle exercises are for patients who can automatically exercise their tongue and lead it to do tongue extension movement. Front, back, up, down, left, right: the movement in every direction lasts for at least 5 seconds. Each exercise should be done 10 times at every session, twice a day. Patients who cannot automatically move their tongue can have the aid of tongue muscle rehabilitation machine to do passive training. Each movement can be done 10 times at every session, once a day.

Mis-inhalation protection training is for patients with low volume, weak cough power and poor airway protection ability.

- Pronunciation training: vowels pronunciation training like (i:) (u:) (a:) (e). It should be gradually stretched at every session daily, in the mornings and at night. Patients are encouraged to sing at least one song every day.
- Effective cough training: patients breathe with nostrils, then hold breath for 3 to 5 seconds and try deeply to cough to effectively clean up airway.
- Pharynx cold stimulation and empty swallowing training: patients with dysphagia in pharyngeal phase and without any heart diseases can use pharynx cold stimulation and empty swallowing training twice a day.

#### *Eating training and guidance outside the hospital*

The eating prescription will be given based on an eating evaluation.

The eating posture should be the natural sitting position. Those who are still weak can use semi-sitting posture, making sure that the head is above 30 degree. Eating amount per morsel: width of the open mouth, chewing ability and control of food in the mouth, triggering of swallowing reflection and the amount of food remaining in the mouth after swallowing are all aspects observed during the eating evaluation. Food property selection: we should choose foods that have uniform density, are compact and distort easily when passing the esophagus, without leaving any residues on the mucosal.

Patients should avoid eating dry, hard, loose, and graininess food. The eating environment should be quiet, talking and laughing being avoided. Patient attention should be kept. Compensatory strategies:

- Swallowing with head up is mainly used for dysphagia patients in oral phase. Gravity should be used to send foods from mouth to pharynx.
- Swallowing with head down is mainly used for patients with poor airway protection ability.
- Swallowing with head nodding is the combination of swallowing with head up and down. It is also useful to reduce the residues on epiglottis and piriform recess to prevent mis-inhalation.

#### *Inspect implementation by WeChat platform*

- The writer formed a PD management WeChat group and invited the experimental group and their families to participate. Three specially trained nurses will be in the group.
- Relevant health education knowledge on dysphagia is periodically published. The relevant complications and dangers of dysphagia are published on Monday, and considerations and knowledge on dysphagia with a video about rehabilitation and eating skills are released on Friday. The release time is from 8:00 to 10:00 in the morning. It is never sent at nap time or at night to avoid disturbing the patients and their families.
- Patients can send their questions about swallowing and nutrition at any time, which will be answered timely.
- We focus on every patient while implementing the rehabilitation training, offering them supervision and guidelines, ensuring the efficiency of measure implementation, and reminding them to undergo periodic re-examination. The intervention strategy is given according to different re-examination situations.
- We record the patients' feedbacks, as well as their problems, and immediately contact the patients who do not undergo re-examination to know their situations and provide them with targeted information and education materials to make them adhere to the rehabilitation method and undergo periodic re-examination.

#### **Intervention method for the control group**

The control group will be given face and tongue training and eating considerations pursuant to the regular guidance method. They will not be given out-of-hospital management intervention.

#### **Statistic analysis**

The dysphagia rehabilitation efficiency and mis-inhalation incidence rate will be compared between the control group and the standardized out-of-hospital management group after 6 months by using SPSS17.9 statistic

software to analyze statistics. The  $p < 0.01$  difference is meaningful for statistics. Rehabilitation efficiency means the rate of patients' function recovered and improved after using intervention method.

## RESULTS

Compared with the control group, patients of dysphagia in the experimental group have apparently higher recovery efficiency through the method of standardized out-of-hospital management. The control group's recovery efficiency is 17%, while the experimental group's is 68.3%, and mis-inhalation rate is 5.1% in the experiment group, while this rate is 22% in the control group. ( $F=21.9$ ,  $p < 0.01$ ) (Tables 3 and 4) (Charts 1 and 2).

**TABLE 3** Comparison of PD dysphagia recovery efficiency between the control group and the experimental group.

Group	Control group		Experimental group	
	Cases	Proportion	Cases	Proportion
Level 6	5	45%	13	86.7%
Level 5	7	30.4%	23	78.2%
Level 4	6	11.3%	38	65.5%
Level 3	1	7.7%	6	40%

**TABLE 4** Comparison of PD dysphagia mis-inhalation rates between the control group and the experimental group.

Group	Control group		Experimental group	
	Cases	Proportion	Cases	Proportion
Level 6	-	-	-	-
Level 5	1	4.3%	-	-
Level 4	13	24.5%	4	6.8%
Level 3	8	61.5%	2	13.3%

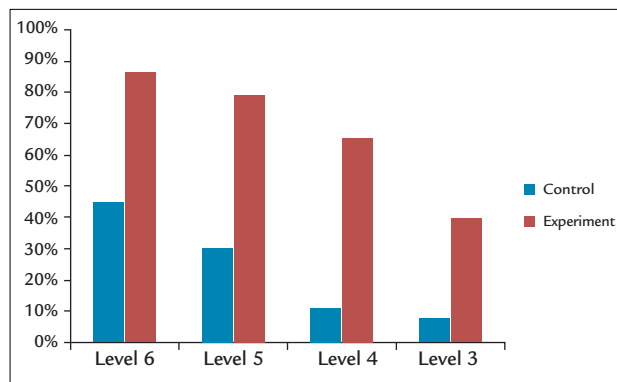
## DISCUSSION

The results show that patients who have low level of dysphagia have higher recovery efficiency.

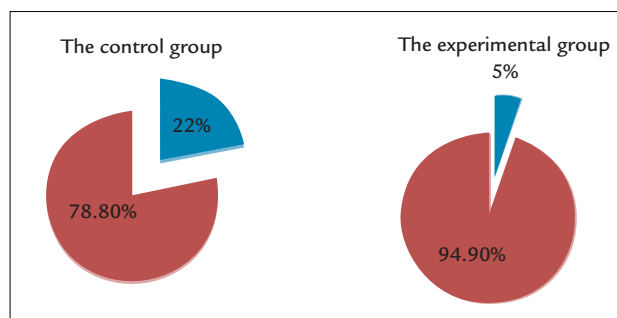
Oral stage is most apparent in early PD dysphagia, and the training of basic skills will be more targeted. Therefore, the building of swallowing management clinics, screening of early dysphagia for PD patients and early out-of-hospital training can maintain the patients' normal swallowing and postpone the progress of dysphagia.

PD dysphagia intervention can be continuously implemented through long-term care and integrated management method, which helps deal with the swallowing problems of different disease stages timely.

PD is a chronic and progressive disease, and PD patients are mainly treated with out-of-hospital health treat-



**CHART 1** Comparison of PD dysphagia recovery efficiency between the control group and the experimental group.



**CHART 2** Contrast of PD dysphagia mis-inhalation rates between the control group and the experimental group.

ments and medicine taking in clinics, and with disease progression, patients will develop the symptom of dysphagia in swallowing and esophagus stages, and therefore, the intervention should make the corresponding adjustment.<sup>15</sup> The studies by Luchesi KF also show that the swallowing ability can be improved through compensation and rehabilitation, which needs a long-term management process.<sup>16</sup> Implementing long-term full concentration methods, making patients check their illness periodically, finding problems timely and adjusting intervention timely can make the intervention more targeted and efficient, ensuring the feeding safety of PD patients.

Multimedia promotion and education with feedback method can improve the accuracy of dysphagia out-of-hospital recovery training, increase recovery rate and reduce the risk of dysphagia as a complication.

It is easier to understand and master the health information through the multimedia. The feedback method, used to evaluate the patients' understanding and mastery of the information provided by doctors, is a type of teaching strategy that can minimize the risk of misunderstanding the information provided.<sup>17,18</sup> Applied in

propaganda and education, the feedback method can improve patients' self-management ability and lower their hospital admission rate.<sup>19,20</sup> PD patients often easily forget and have limited ability to understand the information because of their decline in memory or logical thinking, which will directly impact the effectiveness of promotion and education. Therefore, combining images and onsite presentation with a feedback method for specific instructions can ensure out-of-hospital recovering training accuracy.

The out-of-hospital swallowing management method applied in swallowing management clinics can accomplish a win-win situation for patients and doctors and achieve multiple purposes.

Usually, the nursing staff participates in the tasks of screening and instructing, but rarely takes into consideration the objective assessment of the patients' organic functions and specific recovery treatment strategy.

The WeChat platform can promote the out-of-hospital dysphagia recovery training compliance of PD patients to ensure the effect of recovery training.

The WeChat platform, which supports the sending of text, images, voice and video, is an instant messenger introduced by Tencent Inc, with the characters of quick recovery, free spending, multiple platforms crossing and instant messaging. With the popularity of smart phones, WeChat has become an important platform for people's daily life, work and entertainment.<sup>21,22</sup> PD patients can view and learn at any time through the WeChat. Through the platform, nurses can follow the patients' recovery training at any time and instruct and supervise and urge them in time, thus promoting the patients' self-management efficiency, strengthening and inspiring patients' confidence in overcoming their illnesses and ensuring recovery training efficiency.

## CONCLUSION

With the aging of the Chinese society, PD has become the third largest chronic nervous disease affecting the quality of life of older individuals in China, with an annual morbidity rate of 1-20%.<sup>23,24</sup> At present, there are 4 million PD patients in the world, half of which in China.<sup>25</sup> Dysphagia is bad and dangerous for PD patients' daily life and health. Provided that the patients are treated in hospital, it not only increases their financial burden, but also is not convenient for long-term recovery treatment, which cannot ensure safety while feeding of patients with chronic and progressive disease combined with dysphagia. Therefore, it is definitely necessary

to build the swallowing management clinic for implementing standardized out-of-hospital management to promote or maintain PD patients' swallowing function and lower the rate of complications. Moreover, the experiment shows that swallowing management clinic for implementing standardized out-of-hospital management has great achievement in dealing with PD dysphagia, so it is feasible.

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