



A multicenter cross-sectional survey of the knowledge, attitudes, and practices of geriatric nurses regarding dysphagia care

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Background: Dysphagia is common in the elderly population, and it can lead to complications such as aspiration, undernutrition, and psychological and social interaction disorders in the elderly and have a great impact on quality of life. This study aimed to understand the current knowledge, attitudes, and practices (KAP) of geriatric nurses regarding dysphagia care for elderly adults and to analyze the relevant influencing factors to improve care plans for elderly patients with dysphagia.

Methods: A multicenter cross-sectional survey of 782 geriatric nurses from 17 hospitals in Sichuan Province was conducted using a questionnaire to determine their KAP regarding dysphagia care.

Results: The geriatric nurses' mean score for geriatric dysphagia-related knowledge was 55.30 ± 0.61 (out of a total score of 100). The results of a univariate analysis showed that the geriatric dysphagia-related knowledge scores differed significantly among the nurses according to their age, education level, title, hospital level, and years of work experience ($P < 0.05$). The multivariate regression results indicated that title, hospital level, and experience with caring for elderly patients with dysphagia were the main factors that influenced geriatric dysphagia-related knowledge scores.

Conclusions: The geriatric nurses had acceptable practices and attitudes regarding dysphagia care, but their knowledge regarding geriatric dysphagia needs to be enhanced. Hospital administrators should provide targeted training to improve geriatric nurses' competency in dysphagia care and thus ensure the quality and safety of dysphagia care for elderly patients.

Keywords: Geriatric nurses; dysphagia; knowledge, attitudes, and practices (KAP)

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Introduction

Dysphagia refers to the inability to safely and effectively ingest food through the mouth or transport solid or liquid food to the stomach through the esophagus (1), which often leads to aspiration, undernutrition, and psychological and social interaction disorders and may have adverse consequences, such as death (2,3). Aging, disease, and drugs are among the risk factors for the development of dysphagia. Compared with other populations, elderly adults

are more susceptible to dysphagia. Relevant studies suggest that the incidence of dysphagia is 13–38% in community-dwelling elderly adults (4,5) and 15–68% among elderly nursing home populations (6,7). However, the incidence of dysphagia can reach 30–55% in hospitalized elderly patients due to risk factors such as multimorbidity and the simultaneous use of multiple drugs (8). Dysphagia has gradually become a common clinical problem among elderly adults. However, due to insufficient understanding

of geriatric dysphagia, clinical attention to geriatric dysphagia is inadequate, which can lead to various adverse consequences. Previous research has shown that early and effective nursing intervention can reduce the occurrence of dysphagia-related complications. Therefore, the identification, assessment and intervention of dysphagia should be valued in clinical nursing. Nurses, as sentinels of medical services, have important responsibilities, such as monitoring, supervising, and educating patients as part of patient management. According to the theory of knowledge, attitudes and practices (KAP), knowledge and attitude have an impact on practice. Additionally, good attitudes and practices require a wealth of knowledge as a foundation. Therefore, the geriatric dysphagia-related knowledge of nurses, especially geriatric nurses who interact closely with the elderly, will determine the quality of dysphagia care that elderly patients receive. At present, foreign studies have reported that in view of the impact of swallowing intervention on the nutritional status and hydration status of patients, relevant training and assessment of clinical nursing staff should be further carried out (9). Previous studies on the KAP of nurses regarding the management of geriatric dysphagia have rarely included geriatric nurses; instead, they have focused primarily on neurology nurses. Furthermore, they have primarily investigated samples from tertiary general hospitals and have rarely included samples from secondary hospitals. Nurses from hospitals of different levels have different opportunities to receive training courses, participate in academic forums, and receive continuing education at other hospitals or institutions; consequently, their KAP situations differ. Therefore, secondary hospitals should be included to allow a unified analysis. In this study, 17 tertiary and secondary hospitals in Sichuan Province were included to analyze the KAP of geriatric nurses regarding dysphagia management and determine the influencing factors. We present the following article in accordance with the SURGE reporting checklist (available at <https://apm.amegroups.com/article/view/10.21037/apm-21-3672/rc>).

Methods

Survey tools

At present, some researchers have developed a scale for nurses with dysphagia after stroke (10), but it is not applicable to geriatric nurses. Most studies of nurses' KAP of dysphagia were conducted with a self-made

scale (questionnaire). The questionnaire was developed based on the "Expert Consensus on the Assessment and Treatment of Dysphagia in China" (2017 version) and the questionnaire on the knowledge of dysphagia management developed by Rhoda *et al.* (11). The questionnaire used in this study consisted of four subquestionnaires: (I) a subquestionnaire on general data (including the nurses' educational background, hospital type, hospital level, etc.), (II) a subquestionnaire on the geriatric nurses' dysphagia-related knowledge (a total of 20 multiple choice questions; incorrect answers were scored as 0, and correct answers were scored as 5; total scores ranged from 0–100, with higher scores indicating better knowledge mastery), (III) a subquestionnaire on the geriatric nurses' attitudes toward dysphagia care (a total of 5 items rated with a 5-point Likert scoring system corresponding to "completely disagree, disagree, neither agree nor disagree, agree, or completely agree"; higher scores indicated more positive attitudes toward dysphagia management), and (IV) a subquestionnaire on the geriatric nurses' practices regarding dysphagia management in elderly patients (a total of 6 items rated with a 5-point Likert scale with responses from 1 to 5 corresponding to "never, sometimes, half of the time, most of the time, or always", respectively; higher scores indicated better dysphagia management practices). The higher the score of the questionnaire, the stronger the nursing ability of the geriatric nurses for swallowing disorders, and vice versa. A preliminary experiment was conducted before the formal survey, and unclear items were revised and sent to six experts with a rank of associate or higher to produce the formal questionnaire. The results of the preliminary experiment and the expert evaluation showed that the questionnaire had an internal consistency reliability (Cronbach's α coefficient) of 0.913, a content validity of 0.956, and a test-retest reliability of 0.933.

Survey subjects

In this study, a total of 17 hospitals (14 tertiary hospitals and three secondary hospitals) from eastern, western, southern, northern, and central Sichuan Province were selected. The study lasted from April to May 2019. The nurses included in this study met the following criteria: the possession of a nurse's practice certificate; ≥ 3 years of work experience in geriatrics; voluntary participation in the survey; and being on the job during the survey period. Exclusion criteria were as follows: nurses from other hospitals who were

being trained at the study hospitals, and nurses who were receiving standardized training. This study was approved by the Ethics Committee of the West China Hospital of Sichuan University (No. 1123, approved in 2021) and conducted in accordance with the Declaration of Helsinki (as revised in 2013). All nurses gave their informed consent. According to the literature review and the second edition of *Medical Statistics*, edited by Zhenqiu Sun, a sample size of at least 15–20 times the number of variables included in the multivariate linear regression equation was required. A total of 29 independent variables were included in this survey. Taking into account a loss to follow-up rate of 20%, the calculated sample size was 543–725 cases. To ensure a sufficient and effective sample size, 782 questionnaires were distributed during the survey process.

Survey method

The researchers contacted the head nurses of the geriatrics departments of the participating hospitals, explained the purpose and significance of the study, and provided training regarding the investigation methods to enable the head nurses to cooperate with the survey. The head nurse of the geriatrics department of each participating hospital was the person in charge for that hospital, and she delivered uniform instructions to explain the study to the survey subjects. After the survey subjects provided informed consent, an online survey was conducted in the form of electronic questionnaire. To ensure the authenticity of the study subjects' answers, the subjects were informed that their responses would be anonymous. To ensure the completeness and validity of questionnaires, all questions had to be answered before the questionnaire could be submitted, and only one questionnaire could be submitted per IP address.

Statistical analysis

The data were imported into SPSS 22.0 statistical software for statistical analysis. The general data of the study subjects are described as frequencies and percentages (%). The mean score and accuracy rate of each knowledge dimension and the accuracy rate for each item are expressed as the mean \pm standard deviation ($\bar{x} \pm s$) and percentage (%). The means of two groups were compared using the independent-samples *t*-test. The means of multiple groups were compared using one-way analysis of variance. $P < 0.05$ was considered statistically significant.

Results

Univariate analysis of the effect of geriatric nurses' general characteristics on their KAP regarding dysphagia care

A total of 782 valid questionnaires (100%) were collected in this survey, including 497 (63.6%) from tertiary hospitals and 285 (36.4%) from secondary hospitals. Most of the nurses (61.0%) worked at general hospitals. A total of 59.5% of the nurses were ≤ 30 years old, 50.4% of the nurses had ≤ 5 years of work experience, 50.4% of the nurses had a bachelor's degree, 47.2% of the nurses were nurse practitioners, and 74.4% of the nurses had experience with caring for elderly patients with dysphagia. The results of the univariate analysis (*Table 1*) showed that the dysphagia-related knowledge scores differed significantly among nurses according to their age, education level, hospital type, title, hospital level, and years of work experience ($P < 0.05$) and that the practice and attitude scores differed significantly among nurses according to the type of hospital where they worked and the duration since they had last received training about dysphagia ($P < 0.05$).

Geriatric dysphagia-related knowledge scores of the geriatric nurses

The geriatric nurses had geriatric dysphagia-related knowledge scores of 55.30 ± 0.61 . The mean scores and accuracy rates for the items in each dimension are shown in *Table 2*. The three items with the lowest and highest accuracy rates are shown in *Table 3*.

Results of the multivariate analysis of geriatric dysphagia-related knowledge among geriatric nurses

Six items (age, hospital level, hospital type, years of work experience, education level, and title) had a positive association in the univariate analysis and were included as independent variables ($P < 0.05$). Previous experience with caring for elderly patients with dysphagia was included as a seventh independent variable, and the geriatric dysphagia-related knowledge score was used as the dependent variable in the multiple linear regression analysis (criteria: probability of *F* to enter ≤ 0.05 , probability of *F* to remove ≥ 0.10). The main factors influencing nurses' geriatric dysphagia-related knowledge scores were their title, hospital level, and previous experience with caring for elderly patients with dysphagia. The independent variable assignment methods and the results of the analysis are

Table 1 Univariate analysis of the relationship between the general characteristics of geriatric nurses and their knowledge, attitudes and practices toward dysphagia care (n=782, $\bar{x}\pm s$)

Item	Number of nurses	Proportion of nurses (%)	Knowledge score	Attitude score	Practice score
Age (years)					
≤30	465	59.5	52.35±16.10	20.25±4.04	23.85±4.08
31–35	169	21.6	58.20±16.94	20.33±4.19	24.38±3.48
36–40	70	9.0	60.21±16.14	21.03±3.62	23.73±3.29
41–45	32	4.1	62.03±22.64	20.16±2.80	22.28±3.55
≥46	46	5.9	62.28±15.33	21.46±2.38	23.48±3.13
t/F value			9.886	1.516	2.298
P value			<0.001***	0.196	0.057
Hospital level					
Tertiary Class A	297	38.0	60.77±17.45	20.77±4.15	24.22±3.60
Tertiary Class B	198	25.3	52.50±15.99	20.43±3.51	23.74±3.65
Tertiary Class C	2	0.3	42.50±10.61	22.50±3.54	24.00±8.49
Secondary Class A	173	22.1	51.04±15.44	19.78±4.00	23.14±4.05
Secondary Class B	111	14.2	52.75±15.61	20.30±3.82	24.27±4.24
Secondary Class C	1	0.1	30.00±00.00	20.00±00.00	24.00±00.00
t/F value			11.380	1.525	2.041
P value			<0.001***	0.179	0.071
Hospital type					
General hospital	477	61.0	57.95±17.20	20.67±3.90	23.88±3.60
Geriatric hospital	297	38.0	51.45±15.15	19.95±3.95	23.79±4.15
Other	8	1.0	40.63±28.09	21.13±2.42	26.38±4.60
t/F value			17.215	3.282	1.780
P value			<0.001***	0.038*	0.169
Years of work experience					
≤5	394	50.4	52.60±16.80	20.28±3.93	23.81±4.00
6–10	230	29.4	55.83±15.73	20.29±4.16	24.00±3.89
11–15	86	11.0	58.55±17.47	20.81±3.69	23.94±3.47
≥16	72	9.2	64.51±16.87	20.90±3.29	23.67±3.15
t/F value			12.074	0.892	0.204
P value			<0.001***	0.445	0.894
Education level					
Technical secondary school	22	2.8	52.05±17.71	19.77±3.89	23.36±4.68
Junior college	364	46.5	51.47±16.30	20.13±3.87	23.73±3.90
Bachelor's degree	394	50.4	58.92±16.64	20.67±3.96	24.02±3.73

Table 1 (continued)

Table 1 (continued)

Item	Number of nurses	Proportion of nurses (%)	Knowledge score	Attitude score	Practice score
Master's degree and above	2	0.3	75.00±21.21	23.50±0.71	25.00±2.83
<i>t</i> / <i>F</i> value			14.075	1.811	0.567
P value			<0.001***	0.144	0.637
Title					
Nurse	244	31.2	48.93±16.56	19.91±4.34	23.69±4.62
Nurse practitioner	369	47.2	55.73±15.57	20.48±3.83	24.12±3.56
Supervising nurse	144	18.4	63.47±16.83	20.81±3.50	23.64±3.04
Deputy head nurse	22	2.8	66.14±15.43	21.68±2.63	23.27±3.52
Head nurse	3	0.4	48.33±2.89	21.67±2.08	23.33±1.53
<i>t</i> / <i>F</i> value			21.510	2.064	0.796
P value			<0.001***	0.084	0.528
Duration since last dysphagia training					
Less than one month	147	18.8	53.33±18.60	20.24±4.59	24.07±4.94
Less than half a year	253	32.4	56.92±16.94	20.41±4.41	24.12±3.73
Within one year	144	18.4	55.63±16.62	20.89±3.16	24.42±3.15
Within two years	60	7.7	57.92±14.77	20.47±3.33	23.30±2.84
More than two years ago	178	22.8	53.48±16.17	20.10±3.26	23.08±3.61
<i>t</i> / <i>F</i> value			1.968	0.879	3.399
P value			0.098	0.476	0.009**
Previous experience with caring for elderly patients with dysphagia					
Yes	582	74.4	56.68±17.22	20.47±4.07	23.99±3.85
No	200	25.6	51.28±15.39	20.20±3.46	23.52±3.77
<i>t</i> / <i>F</i> value			3.166 ^Δ	2.320 ^Δ	1.682 ^Δ
P value			0.076	0.128	0.195

^Δ, *t* value; *, P<0.05; **, P<0.01; ***, P<0.001.

Table 2 Mean scores and accuracy rates of geriatric nurses on geriatric dysphagia-related knowledge items

Dimension	Mean score for each dimension ($\bar{x}\pm s$)	Accuracy rate (%)
Risk factors	10.75±5.53	43.02
Clinical manifestations	14.88±6.13	59.51
Assessment methods	16.28±6.17	65.12
Intervention measures	13.39±6.78	53.56

Table 3 The three geriatric dysphagia-related knowledge items with the lowest and highest accuracy rates (n=782)

Item	Accuracy rate (%)
The three items with the lowest accuracy rates	
Cholinergic drugs (nicotine, etc.) do not affect swallowing function	16.37
Aspiration pneumonia can be caused by the entry of food and/or oral secretions into the airways and lungs	27.88
A decreased oral transit time is not the cause of dysphagia	34.40
The three items with the highest accuracy rates	
Excretion status is not the main method for assessing dysphagia	74.81
Increased food intake is not a common clinical manifestation of dysphagia	75.45
The assessment methods for dysphagia do not include gastroscopy	78.26

Table 4 Independent variable assignment

Independent variable	Assignment method
Age	≤30 years =1, 31–35 years =2, 36–40 years =3, 41–45 years =4, ≥46 years =5
Hospital level	Tertiary Class A =6, Tertiary Class B =5, Tertiary Class C =4, Secondary Class A =3, Secondary Class B =2, Secondary Class C =1
Hospital type	Geriatric hospital =3, General hospital =2, Other =1
Years of work experience	≤5 years =1, 6–10 years =2, 11–15 years =3, ≥16 years =4
Education level	Technical secondary school =1, Junior college =2, Bachelor's degree =3, Master's degree and above =4
Title	Nurse =1, Nurse practitioner =2, Supervising nurse =3, Deputy head nurse =4, Head nurse =5
Previous experience with caring for elderly adults with dysphagia	Yes =1, No =0

shown in *Table 4* and *Table 5*, respectively.

Discussion

Nurses' knowledge of drug-related risk factors urgently needs to be strengthened

Experts in dysphagia research suggest that the tendency toward frailty in the elderly population should be fully considered and should be included in routine screenings for dysphagia. The need for dysphagia management should be determined according to the preliminary screening results. The prerequisite for successful dysphagia screening in the elderly population is for nurses to have a good understanding of the risk factors for dysphagia. The results of this study showed that 43.02% of the nurses had accurate knowledge of the risk factors for dysphagia in elderly adults and that only 16.37% of the nurses correctly answered

the item “cholinergic drugs (nicotine, etc.) do not affect swallowing function”, which was the item with the lowest accuracy rate. Most of the nurses failed to accurately identify the types of drugs that have potential negative effects on the swallowing function of the elderly, which was consistent with the findings of Kelly *et al.* (12) that nurses had high error rates in the medication management of patients with dysphagia. In fact, certain types of drugs, such as sedatives and hypnotics, anticholinergics, and antihistamines, can adversely affect the swallowing function of elderly individuals. Sedatives and hypnotics can trigger extrapyramidal reactions and cause dystonia by reducing the excitability of the central nervous system, which leads to decreased coordination between oral processing and swallowing and thus affects eating. Antihistamines and anticholinergics may affect swallowing function by affecting saliva secretion. It is suggested that administrators pay attention to training geriatric nurses in the identification

Table 5 Multivariate analysis of factors affecting the geriatric dysphagia-related knowledge of geriatric nurses (n=782)

Independent variable	Nonstandardized regression coefficient	Standard error	Standardized regression coefficient	t value	P value
Constant	27.583	6.173	–	4.468	<0.001
Title	4.858	1.187	0.230	4.094	<0.001
Hospital level	1.503	0.496	0.135	3.028	0.003
Previous experience with caring for elderly patients with dysphagia	5.118	1.408	0.132	3.636	<0.001

of therapeutic drugs that may cause dysphagia in elderly patients to ensure that these nurses have sufficient knowledge to successfully perform routine screenings of populations at high risk for dysphagia.

Geriatric nurses' knowledge for identifying and preventing aspiration needs to be enhanced

In most cases, dysphagia occurs insidiously, especially in the elderly. In clinical practice, due to the nature of their job, nurses are the first professionals to identify the symptoms and signs of dysphagia in patients. Therefore, the accurate and timely identification of dysphagia symptoms is critical for clinical nurses, especially geriatric nurses. In this study, only 59.51% of the geriatric nurses had accurate knowledge of the clinical manifestations and complications of dysphagia, and only 27.88% correctly answered the item “aspiration pneumonia can be triggered by the entry of food and/or oral secretions into the airways and lungs”, indicating that 72.12% of the geriatric nurses were unsure of the relationship between aspiration and pneumonia. The most common complication of dysphagia is aspiration. Aspiration is divided into silent aspiration and overt aspiration. Silent aspiration is caused by the infiltration of food, fluids or saliva into the subglottis without causing cough. Studies have shown that 15.6% of aspiration pneumonia is caused by silent aspiration (13) and that silent aspiration-induced pneumonia is associated with a higher mortality rate within one month (14). Therefore, the identification of aspiration, especially silent aspiration, is critical for geriatric nurses. In nursing practice, nurses should choose their favorite food to make paste according to the patient's dietary preferences to prevent the occurrence of aspiration. Administrators need to regularly organize opportunities for geriatric nurses to learn the information and methods associated with dysphagia identification and observation, especially certain high-risk complications of dysphagia, to achieve the early

management of suspicious patients.

Geriatric nurses lack knowledge of how to select appropriate foods for patients with dysphagia

Timely early intervention measures can effectively reduce the incidence of dysphagia-related complications. As front-line medical workers, nurses implement nursing interventions that directly affect patient outcomes. Comprehensive clinical intervention measures for dysphagia include active treatment of the primary disease and accompanying symptoms, swallowing rehabilitation, dietary safety management, nursing intervention, and multidisciplinary team management. This study showed that only 53.56% of the nurses had accurate knowledge of dysphagia intervention measures, and only 44.88% of the nurses correctly answered the item “Patients with dysphagia are most susceptible to aspiration when they drink milk or lotus root powder soup or eat noodles or steamed bread”. This result is consistent with the finding of Brady *et al.* (15) that 38% of nurses failed to choose appropriate foods for patients with dysphagia. In fact, the higher the viscosity of a fluid, the lower its flow rate in the mouth and pharynx, which give the patient more time to activate airway protection mechanisms, thereby reducing the risk of aspiration. This suggests that administrators need to provide standardized training for geriatric nurses on intervention measures for dysphagia, especially on the key points of eating safety, to improve the nurses' competency in the intervention and management of dysphagia.

The attitudes and practices of nurses regarding the management of dysphagia in elderly patients are acceptable

The main goal of dysphagia management is to prevent complications such as aspiration and malnutrition so that patients with dysphagia can obtain safe swallowing and,

ultimately, a better quality of life. Nurses, as the medical workers who have the closest contact with patients, play an indispensable role in dysphagia screening, assessment, and intervention. The results of this study showed that 73.4% of the geriatric nurses believed that the identification of dysphagia should not be neglected in nursing work and that 86.6% thought that it is necessary to use relevant scales to screen elderly patients with a high risk of dysphagia in their daily work. However, only 65.1% of the geriatric nurses could provide a timely screening for dysphagia at admission. In addition, up to 91.5% of the geriatric nurses were willing to complete training on dysphagia-related knowledge and skills, and 39.9% indicated a strong willingness to undergo such training. This indicates that administrators should further strengthen the relevant trainings in their departments or throughout the hospital to meet nurses' learning needs regarding geriatric dysphagia-related knowledge and skills. The results of this survey showed that more than 80% of the nurses were able to educate the high-risk population/family members about dysphagia in their daily nursing work and could carefully observe patients' physical signs and provide eating guidance during meals. However, because the items on the questionnaire were objective, the results should be considered with caution. In the future, observations of nurses in a natural setting can be carried out to further explore the actual situation of dysphagia management among nurses. In addition, considering the problems regarding dysphagia-related knowledge among, although nurses provide health education and eating guidance for patients with dysphagia, the scientificity and accuracy of the content of this education and guidance need to be improved.

Difficulties encountered by nurses in caring for elderly people with dysphagia

This study found that 89% of nurses believed that they lacked knowledge and skills related to dysphagia, and 71.87% of nurses lacked the awareness of caring for patients with dysphagia; 44.5% of nurses lack the time to take care of the elderly with dysphagia because they were busy with other tasks. In addition, 30.95% of nurses did not implement care measures because doctors did not issue medical orders related to the evaluation and care of dysphagia. It can be seen that nurses still have many difficulties in the process of caring for patients with dysphagia, which prompts us to strengthen the training of geriatric nurses' knowledge and skills in caring for dysphagia, and promote their active

evaluation and detection of patients with dysphagia. This result also requires multidisciplinary interventions for the disease of dysphagia.

Recommendations regarding dysphagia-related knowledge training for nurses

At present, in some parts of China, nurses' knowledge and practice of swallowing disorders have been studied. Sun *et al.* investigated nurses from neurology departments (neurology department and neurosurgery department) in 18 hospitals in Beijing and found that the cognition of swallowing disorders of nurses was at a medium level, and the number of training, highest educational background, department and position were the main influencing factors (16). Nurses in three hospitals in Guangzhou (neurology, geriatrics, respiratory, cardiovascular and gastroenterology) had poor knowledge of dysphagia (17). A study of geriatric departments in Shenzhen found that nurses' knowledge of dysphagia was not high (18). Nurses in the neurology department are relatively familiar with swallowing disorders, which may be because swallowing disorders are more common in diseases such as stroke, cerebral palsy and brain trauma. This study showed that different titles, hospital levels, and past experiences with caring for elderly patients with dysphagia influenced the geriatric nurses' geriatric dysphagia-related knowledge scores, while age, years of work experience, and educational level were not among the main influencing factors. This may be because most geriatric nurses do not receive dysphagia-specific information or training before or even they begin working, resulting in a lack of motivation and awareness regarding learning about dysphagia. In this study, geriatric nurses with higher titles and those who worked at higher-level hospitals had better knowledge mastery, and knowledge and attitude have an impact on practice. Furthermore, good attitudes and practices require a wealth of knowledge as a foundation, and learning is an essential means of acquiring knowledge. Nurses with higher titles and those who work at higher-level hospitals have more opportunities to take training courses, participate in academic forums, obtain continuing education at other hospitals or institutions, and access richer learning resources and a wider range of learning pathways; consequently, their dysphagia-related knowledge scores were higher. Nurses with lower titles and those who work at lower-level hospitals have less access to medical resources, and updated knowledge becomes available to them more slowly; consequently, their dysphagia-related knowledge scores were lower. Nurses with experience caring

for elderly patients with dysphagia will unconsciously learn information related to geriatric dysphagia on the job and apply their practical nursing experience to enrich their clinical practice. Hospital type and the duration since the last dysphagia training were factors that influenced nurses' practice and attitude scores, suggesting that administrators, especially those at nongeriatric hospitals, need to strengthen dysphagia-specific training and education in general practice and provide diversified training for geriatric nurses according to their characteristics. For nurses with lower titles, administrators should encourage participation in clinical teaching courses, provide them with more learning resources, strengthen management, and implement an assessment system so that these nurses can obtain geriatric dysphagia-related knowledge in a relatively short time. In addition, administrators should take full advantage of nurses with higher professional titles. In clinical practice, new and experienced nurses can be paired, and each experienced nurse can teach a new nurse to further reduce knowledge and competency gaps between new and experienced nurses. Furthermore, different departments should regularly exchange nursing practice experiences to further promote nurses' mastery of geriatric dysphagia-related knowledge and improve their KAP to achieve overall improvement in the quality of the management of elderly patients with dysphagia at the departmental level or even the hospital level.

Limitations of the study

The geriatric nurses had acceptable practices and attitudes regarding the management of dysphagia in elderly patients, but their knowledge related to geriatric dysphagia, especially regarding risk factors such as drug use, recognizing aspiration, and selecting appropriate foods needs to be improved. Administrators should provide training that is targeted according to nurses' characteristics to improve dysphagia management and ensure the safety of elderly patients with dysphagia. On the basis of a literature review, this study used a scientific and objective questionnaire regarding dysphagia management knowledge to investigate the KAP of geriatric nurses toward dysphagia management and analyzed the factors that influenced their KAP. This study design was scientific and realistic as it considers the aging of the population in China and the great importance that the National Health Commission of China has attached to the health status of the elderly population. However, due to the lack of research time, experience, and resources, the study subjects were limited to geriatric nurses at secondary

and tertiary hospitals in Sichuan, and consequently, the national representativeness of the sample was limited. This study was a cross-sectional study, and longitudinal studies are needed to further investigate the causal relationship between the independent variables and the dependent variables.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was approved by the Ethics Committee of the West China Hospital of Sichuan University (No. 1123, approved in 2021) and conducted in accordance with the Declaration of Helsinki (as revised in 2013). All nurses gave their informed consent.

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