Postprint of a Meta-Analysis on the Prevalence of Dysphagia in Chinese Elderly

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Abstract

Background As China has entered an aging society, health issues among older adults have attracted attention due to their association with multiple diseases. In recent years, the prevalence of dysphagia among older adults in China has increased significantly, exacerbating the economic burden on society and families.

Objective To systematically evaluate the prevalence of dysphagia among older adults in China.

Methods A computer-based search was conducted in Pubmed, Web of Science, Embase, the Cochrane Library, CNKI, VIP, Wanfang, and the Chinese Biomedical Literature Database for cross-sectional studies on dysphagia among older adults in China, with the search period extending up to May 2022. Two researchers conducted literature screening and data extraction strictly according to inclusion and exclusion criteria, and the quality of cross-sectional studies was assessed using the AHRQ scale. Meta-analysis was performed using Stata 15.0 software.

Results A total of 22 articles were included, with a total sample size of 308,289 participants, among whom 47,940 patients had dysphagia. Meta-analysis results showed that the prevalence of dysphagia among older adults in China was 66.0% [95%CI (58.0%, 73.0%)]. Subgroup analysis results indicated that the prevalence of dysphagia was identical between males and females. The prevalence was higher among older adults aged $ $80 years, those with higher educational attainment, those in institutional settings, and when diagnosed using the EAT-10 scale.

Conclusion The prevalence of dysphagia among older adults in China is relatively high, with variations across different age groups, educational levels, study

locations, and diagnostic criteria. Early attention to and understanding of dysphagia in older adults are needed, along with the selection of targeted intervention measures to improve quality of life and reduce the prevalence of dysphagia among older adults.

Full Text

Preamble

Prevalence of Swallowing Disorders in Chinese Older Adults: A Meta-analysis

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Abstract

Background: As China has entered an aging society, health problems among older adults have attracted increasing attention due to their association with multiple diseases. In recent years, the prevalence of swallowing disorders among Chinese older adults has risen significantly, imposing a serious economic burden on both society and families.

Objective: To systematically evaluate the prevalence of dysphagia among older adults in China.

Methods: We conducted a comprehensive search of PubMed, Web of Science, Embase, the Cochrane Library, CNKI, VIP, Wanfang, and the Chinese Biomedical Literature Database for cross-sectional studies on dysphagia prevalence in Chinese older adults, with a cutoff date of May 2022. Two researchers independently screened literature and extracted data according to strict inclusion and exclusion criteria. Study quality was assessed using the AHRQ scale for cross-sectional studies. Meta-analysis was performed using Stata 15.0 software.

Results: A total of 22 studies were included, comprising 308,289 participants, of whom 47,940 had swallowing disorders. Meta-analysis revealed that the

prevalence of dysphagia among Chinese older adults was 66.0% [95%CI (58.0%, 73.0%)]. Subgroup analyses showed equal prevalence between men and women. Higher prevalence was observed in individuals aged $ $80 years, those with higher education levels, those in nursing institutions, and when the EAT-10 scale was used as the diagnostic tool.

Conclusion: The prevalence of swallowing disorders among Chinese older adults is high, with significant variations across different age groups, education levels, study settings, and diagnostic criteria. Early attention to and understanding of dysphagia in older adults is needed, along with targeted interventions to improve quality of life and reduce prevalence.

Keywords: Swallowing disorders; Aged; Prevalence; Meta-analysis

Introduction

According to 2019 data from the National Bureau of Statistics [1], China entered the aging era in 2013. By the end of 2019, the population aged 60 and above had increased by approximately 51 million, accounting for 18% of the total population, and this trend is expected to continue accelerating. With the emergence of an aging society, the health of older adults has become a critical challenge. The prevalence of swallowing disorders among older adults has increased annually, with WHO including dysphagia in the 10th International Classification of Diseases. Studies [2] have reported prevalence rates of 11.4%–33.7% among older adults, while international research [3] found rates of approximately 16% in those aged 70–79 and 33% in those aged 80 and above.

Both domestic and international studies [4-6] have demonstrated that dysphagia in older adults increases mortality and long-term hospitalization rates, causes physical and psychological impairments, and can lead to severe complications such as malnutrition, dehydration, and aspiration pneumonia, ultimately affecting patients' social functioning, daily interactions, and quality of life. Therefore, understanding the prevalence of dysphagia among Chinese older adults is essential for raising awareness and promoting health management. However, current epidemiological studies on dysphagia in older adults yield inconsistent results, limited by factors such as sample size, diagnostic criteria, and study region. Moreover, systematic evaluations of dysphagia prevalence among Chinese older adults are lacking. This meta-analysis aims to systematically assess the prevalence of dysphagia among Chinese older adults to provide a reference for targeted prevention and intervention strategies.

Methods

1.1 Inclusion and Exclusion Criteria

Inclusion criteria: (1) Cross-sectional study design; (2) Study population comprising clinically diagnosed older adults with dysphagia; (3) Outcome measure being the prevalence of dysphagia among Chinese older adults.

Exclusion criteria: (1) Studies focusing on middle-aged and older adults without separate analysis; (2) Secondary studies such as reviews and commentaries; (3) Studies with abnormal or incomplete data; (4) Duplicate publications; (5) Full text unavailable; (6) Non-Chinese or non-English language publications.

1.2 Literature Search Strategy

We systematically searched PubMed, Web of Science, the Cochrane Library, Embase, CNKI, VIP, Wanfang, and the Chinese Biomedical Literature Database for epidemiological studies on dysphagia among Chinese older adults, with a cutoff date of May 2022. Reference lists of included studies were also reviewed to supplement the search. The search strategy combined subject headings, free-text terms, and Boolean operators.

English search terms: Aged, Elder*, Aging, Senior*, Old*, Geriatric, Swallowing Disorder*, Swallow* Dysfunction, Swallow* Impair*, Deglutition Disorder*, Disorders, Deglutition, Dysphagia, Oropharyngeal Dysphagia, Dysphagia, Oropharyngeal, Esophageal Dysphagia, Dysphagia, Esophageal, Acataposis, Deglutition Dysfunction, Deglutition Impair*, China, Chinese, Prevalence, Epidemiology, Incidence.

Chinese search terms: 老年人, 老人, 吞咽困难, 吞咽障碍, 咽下困难, 吞咽功能障碍, 咽下障碍, 发病率, 患病率, 现状, 流行病学.

1.3 Literature Screening and Data Extraction

Two reviewers independently conducted literature screening and data extraction, with cross-checking. Disagreements were resolved by a third reviewer. After removing duplicates, titles were screened for relevance, followed by abstract and full-text review for final inclusion. Extracted data included: first author, year, location, survey period, age, sample size, study setting, diagnostic criteria, number of dysphagia cases, and prevalence rates.

1.4 Quality Assessment of Included Studies

We used the Agency for Healthcare Research and Quality (AHRQ) assessment tool for cross-sectional studies [7]. The AHRQ scale comprises 11 items, each scored as "yes" (1 point) or "no/unclear" (0 point), with total scores ranging from 0 to 11. Studies were classified as high quality (8–11 points), moderate quality (4–7 points), or low quality (0–3 points).

1.5 Statistical Analysis

Meta-analysis was performed using Stata 15.0 software. Heterogeneity was assessed using I^2 and Q tests. A fixed-effects model was used if $P > 0.1$ and $I^2 < 50\%$; otherwise, a random-effects model was applied. Subgroup analyses were conducted by sex, age, education level, study setting, and diagnostic criteria to explore sources of heterogeneity. Sensitivity analysis was performed to evaluate result stability. Publication bias was assessed using funnel plots, Begg' s test, and Egger' s test.

Results

2.1 Literature Screening Process and Results

The search yielded 940 articles, of which 22 studies [8-29] were ultimately included after sequential screening [Figure 1: see original paper].

2.2 Basic Characteristics and Quality Assessment of Included Studies

The 22 included studies [8-29] comprised 308,289 older adults, including 47,940 with dysphagia . Quality assessment showed 4 high-quality studies and 18 moderate-quality studies .

2.3.1 Overall Prevalence of Dysphagia Among Chinese Older Adults

The study by Xue et al. [18] reported a prevalence of 1, which creates misleading errors when calculating confidence intervals as it excludes values outside the 0-1 range and compresses variance to zero. Therefore, we applied the Freeman-Tukey double arcsine transformation for data conversion [30]. The 22 studies showed high heterogeneity ($I^2 = 99.6\%$, $P < 0.001$), warranting a random-effects model. The pooled prevalence of dysphagia among Chinese older adults was 66.0% [95%CI (58.0%, 73.0%)] ($I^2 = 99.6\%$, $P < 0.001$) [Figure 2: see original paper].

2.3.2 Subgroup Analysis

Due to substantial heterogeneity, we performed subgroup analyses by sex, age, education level, study setting, and diagnostic criteria using a random-effects model. Results showed: (1) Equal prevalence between men (38.0%) and women (38.0%); (2) Age-dependent increase in prevalence ($P < 0.001$): 21.0% in those aged 60–69, 28.0% in 70–79, and 41.0% in those $ $80 years; (3) By education level: 28.0% in primary school or below, 35.0% in middle school/technical secondary school, and 30.0% in college or above; (4) By setting: 68.0% in hospitals, 56.0% in nursing institutions, and 76.0% in communities; (5) By diagnostic criteria: 32.0% using the Water Swallow Test, 41.0% using the EAT-10 scale, and 35.0% using the 30ml Water Swallow Test .

2.4 Publication Bias Analysis

The funnel plot of 22 studies showed asymmetrical distribution. Begg's test (P = 0.150) indicated no significant publication bias, while Egger' s test (P < 0.001) suggested potential bias. However, results remained stable after trim-and-fill correction [Figure 3: see original paper].

2.5 Sensitivity Analysis

Results remained stable when studies were sequentially excluded, indicating good robustness of the meta-analysis findings [Figure 4: see original paper].

Discussion

Dysphagia is a high-risk factor for mortality and rehospitalization in older adults, seriously compromising their quality of life and psychosocial health [4,5]. Our findings show a 66.0% prevalence of dysphagia among Chinese older adults, higher than the 33.7% reported in European community-dwelling older adults [2], possibly due to cultural differences between countries. Inconsistent prevalence results in China may be attributed to variations in sample size, study region, and diagnostic tools, with no large-scale, multicenter epidemiological surveys available. This comprehensive systematic study provides a reference for early prevention and intervention strategies.

All 22 studies scored 5–8 on the AHRQ scale, indicating moderate-to-high quality. Heterogeneity was substantial across studies. We conducted subgroup analyses by sex, age, education, setting, and diagnostic criteria, along with sensitivity analysis. Publication bias was assessed using Begg' s and Egger' s tests to ensure accuracy and reliability. The 66.0% prevalence in Chinese older adults exceeds the 29.0% reported internationally [31], though one systematic review reported a 4% prevalence of sarcopenic dysphagia [32]. These discrepancies may stem from cultural differences, healthcare education levels, and varying diagnostic criteria across countries.

We found significant differences in prevalence by age, education, study setting, and diagnostic criteria. Unlike previous studies [33,34] reporting higher prevalence in men, we found equal rates between sexes, possibly due to differences in disease types, populations, and survey methods. Future research should further explore sex-specific epidemiology. Subgroup analysis confirmed age-dependent increases in prevalence. Studies [2] have shown that functional degeneration of oral structures and weakened neural receptor reflexes increase dysphagia risk, with older adults being a high-risk population whose comorbidities may exacerbate swallowing disorders [35]. Our meta-analysis showed progressively higher prevalence: 21.0% in ages 60–69, 28.0% in 70–79, and 41.0% in those $ $80 years.

Regarding education, prevalence was higher in those with middle school/technical secondary school education (35.0%) and college or above (30.0%) compared to primary school or below (28.0%). While lower education is generally associated with poorer health management and increased risk [22], higher-educated older adults may have stronger self-esteem and refuse family assistance, leading to dysphagia due to cognitive impairments and inability to self-feed. Analysis by setting showed prevalence rates of 68% in hospitals, 76.0% in communities, and 56.0% in nursing institutions. International cross-sectional studies [36] have reported 47% prevalence among hospitalized older adults. The high rates across all settings in China warrant increased health awareness. Regarding diagnostic criteria, the lack of standardized tools yielded different prevalence rates: 32.0% for the Water Swallow Test, 41.0% for EAT-10, and 35.0% for the 30ml Water Swallow Test. While the Water Swallow Test and 30ml test show good sensitivity but low specificity [37,38], most included studies used the simpler EAT-10 scale. Future research should further investigate the 30ml Water Swallow Test for screening.

Limitations: (1) Significant heterogeneity remained despite subgroup analyses, potentially biasing results; (2) Cross-sectional design limits ability to avoid selection, implementation, and measurement biases; (3) Some studies lacked complete data, possibly causing outcome bias; (4) The study covered only some provinces, not fully representing all Chinese older adults.

In conclusion, dysphagia prevalence is high among Chinese older adults, particularly in women, those aged $ $80 years, those with middle school/technical secondary school education, those in nursing institutions, and when diagnosed using the EAT-10 scale. Increased attention from healthcare providers and appropriate interventions are needed to prevent dysphagia and improve quality of life.

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Note: Figure translations are in progress. See original paper for figures.