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Oral Functional Decline in Thai Older Adults: A Systematic Review and Narrative Synthesis

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Review Article

Abstract

Objective: The decline in oral function is a growing concern among the aging Thai population, affecting nutrition, general health, and quality of life. This systematic review aimed to map the current landscape of research regarding oral functional decline in the older Thai population.

Materials and Methods: A systematic search was conducted in PubMed and Thai local journals for studies published between 1993 and 2025. Eligible studies included randomized controlled trials, quasi-experiments, observational studies, qualitative research, and mixed-methods. Studies were included if they involved Thai individuals aged 60 or older with reported oral function outcomes. Three reviewers independently performed study selection, data extraction, and quality appraisal.

Results: Among the total of 4,292 publications, 11 were selected according to the inclusion criteria, including 2 experimental and 9 non-experimental studies. The prevalence of chewing difficulty among older Thai adults ranged from 0.6–72%, while swallowing problems ranged from 8–59.4%. Xerostomia and hyposalivation were reported at 23–38.4% and 16.4–43.5%, respectively. Speaking problems showed the lowest prevalence, ranging from 3.5–5.6%.

Conclusion: Oral functional decline is prevalent among elderly Thais. However, the evidence remains unclear due to heterogeneity in study designs and assessment methods. Public health strategies should enhance access to oral healthcare and integrate it into broader aging care services in Thailand.

Keywords: Oral function/ Older adults/ Thailand/ Systematic review

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Introduction

The global shift toward aging is a major public health challenge. Thailand entered an aging society in 2005 and is projected to become super-aged by 2030, with 20% of the population aged ≥60 years as of 2023.[1] This demographic change increases demand for geriatric care, with oral health recognized as vital to overall well-being.[2]

Oral functional decline, or oral hypofunction, refers to progressive loss of chewing, swallowing, saliva production, speech, and bite force.[3] These conditions may coexist and are associated with poorer nutrition, health status, and quality of life.[4,5] In Thailand, oral health strategies have traditionally emphasized caries and periodontal prevention. Yet,

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older adults increasingly retain natural teeth while facing functional issues due to muscle weakness, neurological decline, ill-fitting dentures, systemic disease, or medication effects.[6] The emerging concept of oral frailty—a transitional stage between normal function and clinical impairment—serves as a marker for physical and cognitive decline.[7]

In Thailand, although studies have reported that older Thai adults experience chewing and swallowing difficulties, hyposalivation, and reduced neuromuscular coordination such as impaired oral diadochokinesis.[8,9] However, research evidence remains fragmented due to variations in methods and measurements.[3] Oral functional decline is an urgent but underrecognized issue in Thai elderly care, requiring interdisciplinary collaboration in dentistry, geriatrics, primary care, and public health.

This systematic review aimed to map the current landscape of research regarding oral functional decline in the older Thai population, focusing on five domains: eating difficulty, swallowing disorders, hyposalivation, chewing ability, and oral diadochokinesis. Findings aim to inform national strategies, supporting Thailand's "active aging" policy that promotes independence, mental health, and social participation. This review highlights the scope and severity of the issue, while offering evidence-based pathways for intervention. Safeguarding oral function should be considered a shared responsibility across disciplines, including dentistry, primary care, geriatrics, and public health.

Material and Methods

This study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[10], and was registered with PROSPERO (CRD420261362415). Eligible studies included experimental (randomized controlled trials and quasi-experimental studies) and non-experimental designs (cross-sectional, longitudinal, and secondary data analyses), as well as qualitative and mixed-methods studies. Studies were included if they involved Thai adults aged ≥60 years and reported outcomes related to oral function; studies unrelated to oral function or conducted outside Thailand were excluded.

A combined search strategy was employed to maximize contextual relevance, integrating local and international sources. Thai-language journals were first screened through hand-searching (1993–2025) to capture locally published and non-indexed studies, particularly those reflecting routine service and community-based settings. PubMed was subsequently searched (1996–2025) as the principal international database to identify indexed Thai studies, using a broad free-text Boolean strategy due to inconsistent MeSH indexing and evolving terminology. Search terms covered key domains of oral function (e.g., oral function, chewing, swallowing, xerostomia, hyposalivation, oral dryness, and oral diadochokinesis), combined with population (older adults) and setting (Thailand/Thai). Reference lists of included studies were also manually screened to identify additional relevant articles. Study selection and quality appraisal were conducted independently by three reviewers, with disagreements resolved through consensus. Methodological quality was assessed using the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies. Due to substantial heterogeneity in study characteristics and outcome measures, findings were synthesized narratively, and meta-analysis was not performed.

Results

The selection process followed PRISMA 2020 guidelines (Figure 1). Quality assessment indicated that 3 studies were of good quality, 6 moderate, and 2 poor (Table 1). A total of 11 studies focusing on

oral function among Thai older adults aged >50 years were identified using the search terms ("oral function") AND (Thai*). These included both international and local publications, with 4 articles indexed in PubMed and 7 published in Thai journals (Table 2). The studies were categorized by two main dimensions: (1) the type of oral function assessed, and (2) the study design. Five key functional domains were identified: eating difficulties, swallowing function, oral moisture (hyposalivation/xerostomia), chewing ability, and oral motor skills (including oral diadochokinesis and speaking). These domains reflect multidimensional aspects of oral health in aging populations.

Regarding study designs, both experimental (e.g., RCTs and quasi-experimental studies) and non-experimental (cross-sectional, longitudinal, and secondary data analyses) approaches were used. Some studies employed qualitative and mixed-methods designs to capture subjective experiences and perceptions of oral function decline.

Overall, the findings indicate that oral functional impairments are prevalent among older Thai adults, with more pronounced effects in vulnerable subgroups, particularly those with type 2 diabetes, who exhibit higher rates of chewing difficulty and hyposalivation. Nilkamhaeng et al. found that 83% of individuals with type 2 diabetes showed impairments in three or more oral functions, including reduced oral diadochokinesis (85%), chewing difficulty (72%), and dry mouth (23%).[8] Similarly, Sonpanao et al. reported xerostomia (38.4%) and hyposalivation (43.5%) among diabetic elders, both significantly associated with tasting, swallowing, and chewing difficulties, particularly in denture wearers and those with poor glycemic control.[9] Chewing ability was another major concern. Chantaraboot et al. reported that while 94.4% of older adults were comfortable speaking, only 45.8% felt comfortable chewing, with discomfort correlated with age and poor oral health.[11] Salimee et al. found no significant differences in masticatory performance among denture types but noted a gap between perceived and measured chewing ability.[12]

In terms of diagnostic tools, Kasa et al. validated the Thai Xerostomia Inventory (XI) with high reliability[13], while Chantaramanee et al. confirmed that the Thai version of the Oral Frailty Five-Item Questionnaire (OF-5) achieved strong sensitivity (96%) and specificity (83%) for detecting oral frailty.[14] Several studies examined swallowing function using validated tools such as Thai version of the Eating Assessment Tool (Thai EAT-10) and the 3-ounce Water Swallow Test (WST). Kongma et al. demonstrated high sensitivity (100%) and specificity (93.4%) in dysphagia screening when combining these tools.[15]

Emerging interventions are increasingly developed to restore oral function in older Thai adults. For instance, Wongworasun et al. reported that oral exercise programs improved swallowing ability and increased salivary flow rate[16], while Chotprakaikiat et al. developed elderly-friendly oral lubricants, identifying 2.7% hydroxypropyl methylcellulose (HPMC) as comparable to KY® Jelly in alleviating dry mouth symptoms.[17]

Collectively, these findings underscore the widespread presence of oral function decline among Thai older adults and highlight the importance of culturally adapted assessment tools and evidence-based interventions to address oral frailty in this population.

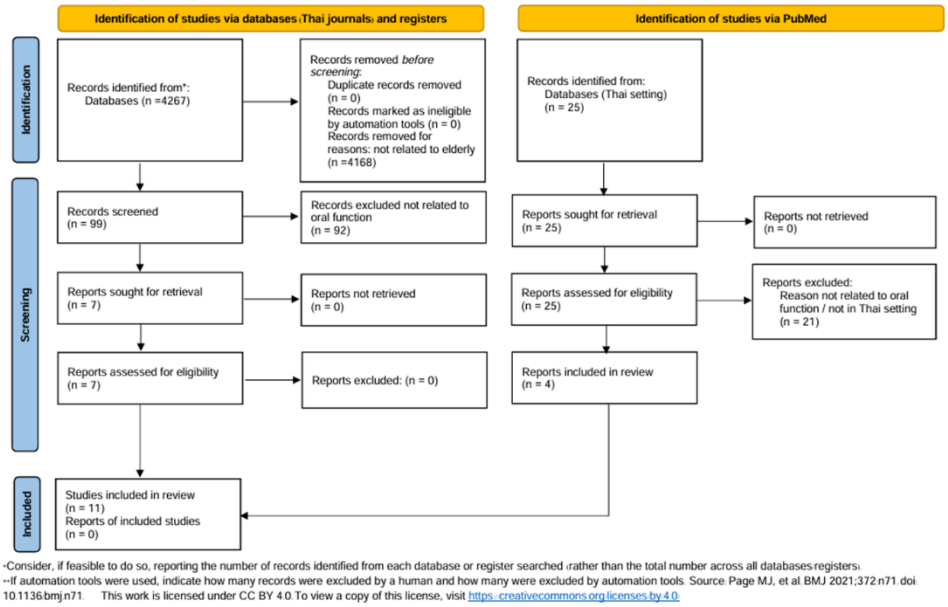


Figure 1 PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

Table 1 Quality assessment of the studies based on The National Institutes of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Authors/yr	Criteria														Quality rating
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Nilkamhaeng P. /2024	Y	Y	Y	Y	Y	CD	CD	CD	Y	CD	Y	NA	Y	NR	moderate
Kongma P. /2023	Y	Y	Y	Y	NR	Y	Y	CD	Y	Y	Y	N	Y	NR	moderate
Salimee P. /2003	Y	Y	Y	NR	NR	Y	NA	NA	Y	N	Y	NR	Y	NR	poor
Kasa k. /2022	Y	Y	Y	Y	NR	Y	NA	CD	Y	Y	Y	NR	Y	NA	moderate
Chotprakaikiat W. /2023	Y	Y	CD	CD	CD	CD	CD	CD	Y	Y	Y	NR	CD	Y	poor
Sonpanao P. /2023	Y	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	NA	Y	Y	good
Chantaraboot Y. /2022	Y	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	NA	Y	Y	good
Iwasaki M. /2018	Y	Y	N	NR	NR	Y	NA	Y	Y	N	Y	NA	Y	Y	moderate
Kongma P. /2023	Y	Y	Y	Y	Y	Y	NA	Y	Y	N	Y	NR	Y	NA	moderate
Wongworasun S. /2022	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y	N	Y	good
Chantaramanee A. /2025	Y	Y	Y	Y	NR	Y	NA	Y	Y	N	Y	NR	Y	NA	moderate

Quality of the selected observational study was assessed using the National Institutes of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies Criteria1. Was the research question or objective in this paper clearly stated? Criteria 2. Was the study population clearly specified and defined? Criteria 3. Was the participation rate of eligible persons at least 50%? Criteria 4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants? Criteria 5. Was a sample size justification, power description, or variance and effect estimates provided? Criteria 6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured? Criteria 7. Was the time frame sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed? Criteria 8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)? Criteria 9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? Criteria 10. Was the exposure(s) assessed more than once over time? Criteria 11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? Criteria 12. Were the outcome assessors blinded to the exposure status of participants? Criteria 13. Was loss to follow-up after baseline 20% or less? Criteria 14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)? The overall judgment is determined by Good, Moderate, Poor. CD, cannot determine; NA, not applicable; NR, not reported.

Table 2 Data extraction oral function in Thailand

No	Author/Year	Setting	Study Type*	Subjects	Sample size (n)	Objective	Oral function type**	Measurement	Main result
1	Nilkamhaeng P. /2024	Lopburi	2.1	DM type 2/ age 60+	100	Identify impaired oral function prevalence	1,2,3,4,5	1, 2 = questionnaire/ subjective 3 = oral moisture checking device (Mucus®, Life Co., Saitama, Japan) 4 = color change chewing gum 5 = repeat single syllable (ODK)	1 = 72% 2 = 8% 3 = 23% 4 = 35% compromised chewing ability 5 = 85% decreased odk 83% ≥ 3 impaired oral functions
2	Kongma P. /2023	Chiang Rai	4	Health related personnel to screen elderly aged 60+	33 (8 healthcare personnel)	Build capacity for oral and dysphagia screening in elderly care	2	2 = Thai EAT-10® and 3-ounce water swallow test	Routine health practitioners can gain dysphagia screening skills in older adults using only Thai EAT-10®.>> easy to use
3	Salimee P. /2003	Bangkok	4	Elderly wearing CD/RPD	62	Evaluating masticatory ability & performance in elderly pt. wearing denture	1	Gr1=CD, Gr2=RPD, Gr3= RPD/natural dentition masticatory ability = Questionnaire masticatory performance = sieving tech.	masticatory performance no sig. between in 3 Gr no relationship bet. masticatory ability & masticatory performance
4	Kasa k. /2022	Phitsanulok	2.1	Thai elderly	30	translate and test validation & reliability of the Thai version of the XI	3	Forward & Backward Translation xerostomia inventory 11 item (thai version) IOC + Cronbach's alpha coefficient	IOC = 0.67-1 Cronbach's alpha = 0.855 ICC score >0.2 The Thai version of XI is a tool with validation and reliability, which can be used for elderly
5	Chotprakaikiat W. /2023	No data	1	lab	-	formulate oral lubricants for elderly patients.	3	Component : deionized water, gel-forming agent (Hydroxypropyl methylcellulose; HPMC) & moisturizer	2.7% HPMC suitable for using in oral cavity (as same as KY® jelly)
6	Sonpanao P. /2023	Nakhon Ratchasima	2.1	DM type 2 aged 50+	623	investigate the prevalence of xerostomia in older people with DM and impacts on oral functions	1,2,3,4,5	**Subjective Evaluation** 3 = five yes-no questions 2 = 7-point FOIS 1,4 = 14 listed food items 5 = no data (good, moderate, poor) **objective diagnostic tests** 3 = Unstimulated salivary flow rate : UWS (spitting method)+Oral moisture (cotton method)	1 = 0.6% 2 = 59.4% 3 = 38.4% xerostomia (43.5% hyposalivation) 5 = 3.5% Speaking Problem Xerostomia/ denture , spicy toothpaste ,poor glycemic control, / >5 years DM Tasting problems / >5 years DM , xerostomia Swallowing problems /denture, xerostomia. chewing problems / dentures, xerostomia

Table 2 Data extraction oral function in Thailand (Cont.)

No	Author/Year	Setting	Study Type*	Subjects	Sample size (n)	Objective	Oral function type**	Measurement	Main result
7	Chantara Boot Y. /2022	Roi Et	2.1	age 60+	249	factors associated with self-reported oral health among older adults	4,5	self-reported oral health 4, 5 = 3-point scale questionnaire "How would you rate your chewing ability?", "How would you rate your speaking ability?"	4 = 45.8% feeling comfortable chewing 5 = 94.4% feeling comfortable speaking 17.3% self-reported good oral health. poor oral health /older age, chewing discomfort
8	Iwasaki M. /2018	Nakhon Pathom	2.1	age 60+	141	association bet. chewing ability and frailty	4	4 = Masticatory Performance Evaluating Gum (the difference in gum color before & after chewing) low **Δ**E*ab = low chewing ability	22.7% frail and 55.3% pre-frail 1 = 20.6% Self-perceived difficulty with chewing 4 = 41.9 / Robust =46, Pre-frail =42, Frail= 37.6 (**Δ**E*ab) severity of frailty was significantly higher in participants with lower chewing ability
9	Kongma P. /2023	Chiang Mai	2.1	age 20+	260	evaluate the validity of Thai EAT-10 & the 3-ounce Water Swallow Test (WST)	2	2 = Thai EAT-10 (score>3), the 3-ounce Water Swallow Test (WST)	2 = 12.3% 100% sensitivity, 93.4% specificity Thai EAT-10+ WST has higher reliability& validity than 2 test alone (close to gold std. FEES) Thai EAT-10 alone– high sen & spec >> easy to use and safe in the community
10	Wongwo rasun S. /2022	Chonburi	1	age 60+	244	compare the effectiveness of 2oral exercise programs on oral fn. among independent elderly people	2,3,4	**Subjective Evaluation** 2 = DRACE (12-item questionnaire) >5 : poor swallowing 3 = Xerostomia Inventory (XI) 4 = 21-item Thai food intake questionnaire **objective diagnostic tests** 2 = RSST (swallow saliva repeatedly 30s : RSST < 3 -poor swallowing) 3 = UWS (<0.1 mL/min.= Hyposalivation)	4 =satisfactory 3 =mild dry mouth, mean XI of 20.71, 16.4% hyposalivation 2 = average RSST of 3.26, mean DRACE 4.28 (DRACE ≥5 = 40.2%), indicating the onset of swallowing problems oral fn had a chance to improve in both oral exercise programs

Table 2 Data extraction oral function in Thailand (Cont.)

No	Author/Year	Setting	Study Type*	Subjects	Sample size (n)	Objective	Oral function type**	Measurement	Main result
11	Chantara manee A. /2025	Phitsanulok	2.1	age 65+	30	translate, culturally adapt, and validate the Thai version of the OF-5 for use in Thailand	1,2,3,4,5	Oral frailty is identified when >2 of the following are present: (i) fewer teeth (ii) chewing difficulty (iii) swallowing difficulty (iv) dry mouth (v) reduced oral motor skills Forward & Backward Translation Reliability : A test-retest Comparison with Standard Methods • Chewing ability test (GLUCOSENSOR ®) (cut point <100 mg/dL) • Repetitive Saliva Swallowing Test (RSST) (cut point <3) • Oral moisture checker (MUCUS®) (cut point <27) • Oral Diadochokinesis (cut point<6)	Thai OF-5 showed excellent content validity (IOC:+0.92) high reliability (ICC: 0.82) Sensitivity 96%, specificity 83%, easy to use, completing it in 2–5 minutes. The Thai OF-5 is a valid, reliable, and user-friendly tool for assessing oral frailty in community settings to enhance elderly health

***Study type :** 1= Experiment: RCT/ quasi experiment with control/ others ex.laboratory; 2 = Non-experiment: 2.1 cross-sectional/ 2.2 longitudinal study/ 2.3 secondary data; 3 = Qualitative research; 4 = Mixed methods

****Oral function type :** 1 = Eating Difficulties; 2 = Swallowing; 3 = oral moisture/ hyposalivation/ xerostomia; 4 = Chewing ability; 5 = Oral diadochokinesis/ speaking problem

Discussion

This review demonstrates that oral functional decline is commonly observed among older Thai adults, particularly in chewing, swallowing, and xerostomia. Chewing difficulties (0.6%- 72%)[8,9,18] correspond with global evidence identifying reduced masticatory function as an early indicator of age-related oral deterioration, with implications for nutrition, quality of life, frailty, and cognitive decline.[3,5,7] Swallowing disorders (8%-59.4%) and xerostomia (23% - 38. 4%)/hyposalivation (16.4% - 43.5%) further illustrate the multifactorial nature of oral hypofunction, often occurring as symptom clusters that support the concept of oral frailty as a transitional state preceding broader geriatric syndromes.[9,19] However, although the search strategy was designed to maximize contextual relevance for Thailand by combining Thai-source hand-searching with PubMed searching, some studies indexed in other international databases may have been missed. Therefore, this limitation should be considered when interpreting the completeness of the evidence base.

The findings highlight the value of culturally adapted and validated tools, such as the Thai OF-5, EAT-10 and Xerostomia Inventory, which demonstrated high sensitivity and specificity for community-based screening and early detection.[13,14,15] These tools enable non-dental personnel to identify at-risk individuals, particularly in primary care and rural settings. However, discrepancies between self-reported and objective measures, along with heterogeneity in study designs, highlight the need for multimodal assessment, standardized protocols, and longitudinal research to clarify causal pathways and long-term outcomes across diverse older populations.

Interventions such as structured oral exercise programs, denture management, and locally formulated lubricants show potential in mitigating dysfunction and improving quality of life.[16,17,18] Findings from this study provide evidence to inform national policy in Thailand by supporting the integration of validated screening tools and preventive strategies into “active aging” initiatives to enhance independence, nutrition, and well-being.[20] Oral functional decline remains a critical yet underrecognized aspect of geriatric health, underscoring the need for interdisciplinary approaches to preserve oral function and prevent downstream complications in aging populations.

Conclusion

Current evidence does not allow a definitive conclusion on the national prevalence of oral functional decline among older Thai adults. However, validated and culturally adapted screening tools are available for community use, and oral functional decline represents a significant burden, particularly among vulnerable groups such as individuals with diabetes. Importantly, there remains a lack of large-scale, population-based data, highlighting the need for longitudinal studies to establish accurate national prevalence estimates.

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Conflict of Interest

None

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ภาวะการเสื่อมถอยของการทำหน้าที่ของช่องปากในผู้สูงอายุไทย: การทบทวนวรรณกรรมอย่างเป็นระบบและการสังเคราะห์เชิงบรรยาย

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บทความปริทัศน์

บทคัดย่อ

วัตถุประสงค์: ภาวะการทำหน้าที่ของช่องปากที่เสื่อมถอย เป็นประเด็นที่น่ากังวลมากขึ้นในผู้สูงอายุไทย ซึ่งส่งผลต่อภาวะโภชนาการ สุขภาพ และคุณภาพชีวิต การทบทวนวรรณกรรมอย่างเป็นระบบนี้มีวัตถุประสงค์เพื่อสำรวจและจัดทำแผนภาพองค์ความรู้ในปัจจุบันเกี่ยวกับภาวะการเสื่อมถอยของการทำหน้าที่ของช่องปากในประชากรผู้สูงอายุไทย

วัสดุอุปกรณ์และวิธีการ: ดำเนินการสืบค้นข้อมูลอย่างเป็นระบบจากฐานข้อมูล PubMed และวารสารในประเทศไทย ระหว่างปี พ.ศ. 2536–2568 งานวิจัยที่ถูกรวบรวม ประกอบด้วยการทดลองแบบสุ่มและมีกลุ่มควบคุม การทดลองแบบกึ่งทดลอง การศึกษาเชิงสังเกต การวิจัยเชิงคุณภาพ และการวิจัยแบบผสม โดยมีเกณฑ์การคัดเลือกคือ เป็นผู้สูงอายุไทยที่มีอายุตั้งแต่ 60 ปีขึ้นไป และมีรายงานผลลัพธ์ที่เกี่ยวข้องกับการทำหน้าที่ของช่องปาก โดยผู้ประเมินจำนวน 3 คน ได้ดำเนินการคัดเลือกรายงานวิจัย การสกัดข้อมูล และประเมินคุณภาพของงานอย่างเป็นอิสระต่อกัน

ผล: จากงานวิจัยทั้งหมด 4,292 เรื่อง มีจำนวน 11 เรื่อง ที่ได้รับการคัดเลือกตามเกณฑ์การคัดเข้า โดยประกอบด้วยงานวิจัยเชิงทดลอง 2 เรื่อง และงานวิจัยที่ไม่ใช่เชิงทดลอง 9 เรื่อง โดยค่าความชุกของปัญหาการบดเคี้ยวอาหารลำบากในผู้สูงอายุไทยมีช่วงตั้งแต่ร้อยละ 0.6–72 ขณะที่ปัญหาการกลืนอยู่ในช่วงร้อยละ 8-59.4 ส่วนภาวะปากแห้งและภาวะน้ำลายน้อยพบความชุกอยู่ในช่วงร้อยละ 23–38.4 และ 16.4–43.5 ตามลำดับ โดยปัญหาด้านการพูดพบความชุกต่ำที่สุด อยู่ในช่วงร้อยละ 3.5–5.6

บทสรุป: ความเสื่อมถอยของการทำงานหน้าที่ของช่องปากพบได้บ่อยในผู้สูงอายุไทย โดยเฉพาะความยากลำบากในการบดเคี้ยวและการกลืน อย่างไรก็ตาม ข้อมูลยังไม่ชัดเจนเนื่องจากความหลากหลายของรูปแบบการศึกษาและวิธีการประเมิน จึงควรมีการส่งเสริมกลยุทธ์ด้านสาธารณสุข เพื่อเพิ่มการเข้าถึงการดูแลทางทันตสุขภาพ และบูรณาการเข้ากับการดูแลผู้สูงอายุโดยรวมในประเทศไทย

คำไขรหัส: การทำงานของช่องปาก/ ผู้สูงอายุ/ ประเทศไทย/ การทบทวนวรรณกรรมอย่างเป็นระบบ

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