

ASSOCIATIONS OF ORAL HEALTH INDICATORS AND DEPRESSIVE SYMPTOMS AMONG OLDER ADULTS IN BANGKOK LONG-TERM CARE FACILITIES

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ABSTRACT

Oral hypofunction and clinical oral problems may relate to depressive symptoms among older adults in long-term care (LTC) facilities in Bangkok. In this cross-sectional study of 83 LTC residents, depressive symptoms were assessed using TGDS-15 (cut-off ≥ 8), while oral status was captured using OHAT total score (0-16) and oral hypofunction burden using OHF count (0-7 failed domains); associations were examined with Spearman's rank correlation. The mean TGDS-15 score was 4.46 ± 3.74 and 21.7% met the depressive-symptom cut-off; OHF prevalence was 66.3% with an average OHF count of 3.34 ± 1.78 , and the mean OHAT total score was 5.80 ± 2.67 . TGDS-15 scores showed significant positive correlations with OHAT ($r_s = .401$, $p < .001$) and OHF count ($r_s = .257$, $p = .019$). These findings suggest that both observable oral health problems and overall oral functional burden are significantly associated with psychological well-being in LTC residents. Consequently, routine oral screening is essential for early identification and intervention for both oral and mental health needs.

Keywords: TGDS-15, Depressive Symptoms, Oral Health Assessment Tool (OHAT), Oral Hypofunction, Long-Term Care

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INTRODUCTION

Older adults residing in long-term care (LTC) facilities commonly experience a substantial burden of oral health problems and unmet dental needs, which can adversely affect daily comfort and overall quality of life (Wong et al., 2019; Porter et al., 2015). At the same time, depression remains a prevalent concern in institutional settings worldwide, including among Thai LTC residents (Wang et al., 2024; Somporn et al., 2012). Increasing evidence highlights an interrelationship between oral health and psychosocial well-being, suggesting that poor oral health status and functional decline may contribute to the onset or persistence of depressive symptoms over time (Ohi et al., 2022; Kunrath & Ribeiro Silva, 2021).

Within geriatric dentistry, oral hypofunction (OHF) is recognized as a multidimensional construct encompassing declines in oral sensory and motor functions (Minakuchi et al., 2018). Systematic reviews have demonstrated associations between OHF, general health, and frailty-related outcomes (Limpuangthip & Komin, 2023; Shimazaki et al., 2020). In LTC populations, OHF has been linked to increased functional dependency and a greater need for assistance with daily activities (Oura et al., 2022). Moreover, declining oral function may reduce social participation; longitudinal evidence suggests that OHF is associated with social withdrawal (Hasegawa et al., 2021). Given the close relationship between social engagement and mental health in later life, eating-related social isolation has also been associated with both depression and oral frailty (Sakurai et al., 2021; Ohara et al., 2020).

For practical screening in LTC settings, the Oral Health Assessment Tool (OHAT) provides a reliable measure of clinical oral health status, whereas oral hypofunction (OHF) captures multidimensional decline in oral function among older adults (Chalmers et al., 2005; Minakuchi et al., 2018). Depressive symptoms can also be effectively assessed using the Thai Geriatric Depression Scale-15 (TGDS-15), which has been validated in Thai older adults (Wongpakaran et al., 2013). Although previous studies in Thailand have reported associations between dental status and depression, evidence in Thai LTC settings remains limited, particularly studies that integrate both clinical oral health and oral functional decline within the same analytical framework (Supapanich & Arunsri, 2023). This gap is important because LTC residents often have complex oral and psychosocial vulnerabilities, and brief, feasible screening tools are needed to support integrated care in routine practice (Chalmers et al., 2005; Wang et al., 2024). Therefore, this study aimed to examine the association between depressive symptom (TGDS-15 score) and two oral health indicators-clinical oral health status (OHAT total score) and oral hypofunction burden (OHF domain count)-among older adults residing in LTC facilities in Bangkok.

LITERATURE REVIEWS

Oral health problems remain common among institutionalized older adults and are associated with reduced comfort and poorer quality of life (Wong et al., 2019; Porter et al., 2015). In addition to clinical oral conditions, oral hypofunction (OHF) has been recognized as a multidimensional decline in oral sensory and motor performance and has been associated with frailty-related outcomes, general health problems, and functional dependency in older adults (Minakuchi et al., 2018; Shimazaki et al., 2020; Limpuangthip & Komin, 2023; Oura et al., 2022). Emerging evidence also suggests that oral health and psychosocial well-being are interrelated, with oral functional deterioration, social withdrawal, and depressive symptoms potentially clustering in later life (Kusama et al., 2021; Hasegawa et al., 2021; Ohi et al., 2022). Taken together, these findings support the relevance of evaluating both clinical oral health status and oral functional decline when examining depressive symptoms among older adults in long-term care settings.

Research Hypothesis

- 1) There is a significant positive correlation between OHAT total score and TGDS-15 score among older adults residing in Bangkok long-term care facilities.
- 2) There is a significant positive correlation between OHF domain count and TGDS-15 score among older adults residing in Bangkok long-term care facilities.

Conceptual Framework

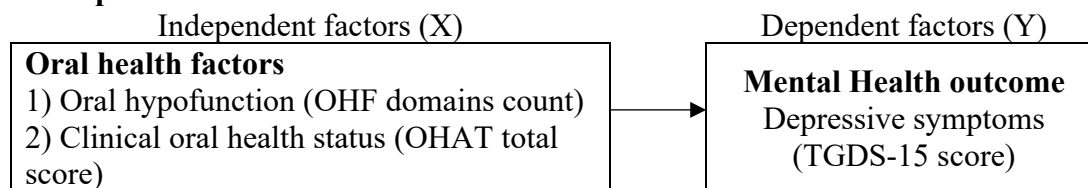


Figure 1 Conceptual framework

RESEARCH METHODOLOGY

Study design and setting

This cross-sectional descriptive study was conducted among older adults residing in two long-term care (LTC) facilities in Bangkok, Thailand. A total of 83 participants were included in the final analysis.

Sample size adequacy

A sensitivity analysis was conducted using G*Power 3.1 for a two-tailed bivariate correlation model. With an alpha level of 0.05 and a total sample size of 83, the study had 80% power to detect a correlation coefficient of approximately 0.30 or larger. Therefore, the available sample size was considered adequate to detect at least a moderate association between depressive symptoms and oral health indicators in this correlation study (Faul et al., 2009).

Participants

Eligible participants were aged ≥ 60 years, able to communicate in Thai, and provided written informed consent. Participants with severe cognitive impairment, stroke, Parkinson's disease, or a history of head and neck cancer were excluded.

Data collection

Depressive symptoms (TGDS-15 score)

Depressive symptoms were assessed using the Thai version of the 15-item Geriatric Depression Scale (TGDS-15), consisting of 15 yes/no items; higher total scores indicate more severe depressive symptoms. (Wongpakaran et al., 2013) A cut-off score of ≥ 8 was used in this LTC setting to indicate a high likelihood of depression.

Oral Hypofunction Assessment

Oral hypofunction was evaluated based on seven domains using the criteria established by the Japanese Society of Gerodontology (Minakuchi et al., 2018). The assessment procedures and cut-off values for each domain were defined as follows:

- 1) Oral hygiene: Assessed by visual inspection of the tongue surface using the Tongue Coating Index (TCI). Poor oral hygiene was defined as a TCI score of $\geq 50\%$.
- 2) Oral dryness: Measured using an oral moisture checker (Mucus®, Life Co., Ltd., Japan) at the buccal mucosa. A moisture level of < 27.0 indicated oral dryness.
- 3) Occlusal force: Evaluated based on the number of functional natural teeth. A count of < 20 teeth was considered indicative of reduced occlusal capacity.
- 4) Tongue-lip motor function: Assessed via oral diadochokinesis (ODK). Participants were asked to pronounce the monosyllables /pa/, /ta/, and /ka/ as quickly as possible for 5 seconds. A rate of < 6 repetitions/second for any syllable was defined as hypofunction.
- 5) Tongue pressure: Measured using a digital tongue pressure gauge with a balloon probe (JMS TPM-01, JMS Co., Ltd., Japan). A maximum pressure of < 30 kPa indicated decreased tongue function.

6) Masticatory function: Evaluated by checking the comminution of a test gummy jelly (UHA Mikakuto Co., Ltd., Japan) after 30 strokes of chewing. A visual score of ≤ 2 indicated masticatory dysfunction.

7) Swallowing function: Assessed using the Repetitive Saliva Swallowing Test (RSST). The number of swallows was counted by palpating laryngeal movement over 30 seconds, with < 3 swallows indicating decline.

The total OHF count was calculated as the sum of impaired domains, ranging from 0 to 7.

Oral health status (OHAT total score)

Clinical oral health status was assessed using the Thai version of the Oral Health Assessment Tool (OHAT), a screening tool covering eight categories (lips, tongue, gums/tissues, saliva, natural teeth, dentures, oral cleanliness, and dental pain). (Chalmers et al., 2005) Each category was scored 0 (healthy), 1 (changes), or 2 (unhealthy), yielding a total score of 0-16; higher scores indicate poorer oral health status. (Chalmers et al., 2005)

Statistical analysis

Data were analyzed using IBM SPSS Statistics (version 28). Descriptive statistics (mean, SD, frequency) were used to summarize TGDS-15 scores, OHF count, and OHAT total scores. Spearman's rank correlation coefficient (r_s) was used to evaluate associations between **TGDS-15 score and OHAT total score**, and between **TGDS-15 score and OHF count**. Statistical significance was set at $p < 0.05$.

RESEARCH RESULTS

Participant characteristics

Table 1 summarizes the demographic characteristics of the study participants. A total of 83 older adults residing in long-term care (LTC) facilities in Bangkok were included. The mean age was 78.08 ± 5.93 years (range 63-93), and 71.1% were female ($n = 59$). The mean body mass index (BMI) was 22.71 ± 3.91 kg/m²; most participants reported no smoking (83.1%) and no alcohol drinking (83.1%).

Table 1 Descriptive Statistics of the Study Population (N = 83)

Characteristics	Mean $\pm$ SD or n (%)
Age (years)	78.08 ± 5.93
Gender (Female)	59 (71.1)
Body Mass Index (kg/m ²)	22.71 ± 3.91
Smoking (No)	69 (83.1)
Alcohol drinking (No)	69 (83.1)

Clinical scores (TGDS-15, OHF count, OHAT)

Table 2 presents the clinical characteristics of the participants. The mean TGDS-15 score was 4.46 ± 3.74 (range 0-14), and 21.7% of participants ($n = 18$) met the cut-off for depressive symptoms. Oral hypofunction was observed in 66.3% of participants ($n = 55$), with a mean OHF count of 3.34 ± 1.78 failed domains (range 0-7). The mean total OHAT score was 5.80 ± 2.67 (range 0-14).

Table 2 Descriptive Scores for Oral Health and Depression

Clinical Parameter	Mean $\pm$ SD	Minimum-Maximum	Prevalence n (%)
TGDS-15 Score (Depression)	4.46 ± 3.74	0-14	18 (21.7)
OHF Count (Failed Domains)	3.34 ± 1.78	0-7	55 (66.3)
Total OHAT Score	5.80 ± 2.67	0-14	-

Correlation analysis

Table 3 presents the correlations between depressive symptoms and oral health variables. Spearman's rank correlation showed that TGDS-15 scores were positively correlated with total OHAT score ($r_s = .401$, $p < .001$) and OHF count ($r_s = .257$, $p = .019$).

Table 3 Spearman's Correlations between Oral Health and Depression Scores

Oral Health Indicators	Correlation Coefficient (r_s)	p-value
Total OHAT Score	.401	<.001*
OHF Count	.257	.019*

*Significant at the 0.05 level.

DISCUSSION & CONCLUSION

The study included 83 older adults residing in long-term care (LTC) facilities in Bangkok, with a mean age of 78.08 ± 5.93 years. The sample was predominantly female (71.1%) and had a mean body mass index (BMI) of 22.71 ± 3.91 kg/m². Most participants reported no history of smoking or alcohol consumption (both 83.1%). This profile is characteristic of LTC populations, where cumulative health risks and functional limitations may influence daily functioning and overall well-being.

Older adults in LTC settings often experience multiple vulnerabilities affecting both physical and psychological health, with depression representing a significant concern in institutional care (Wang et al., 2024; Somporn et al., 2012). Oral health problems are likewise prevalent, and systematic evidence consistently highlights a substantial burden of unmet dental needs among institutionalized older populations (Wong et al., 2019; Czwikla et al., 2021). Against this background, the present study investigated whether depressive symptoms (TGDS-15 score) is associated with two concise and practical oral health indicators suitable for LTC screening: clinical oral health status (OHAT total score) and oral hypofunction burden (OHF domain count) among older adults in Bangkok LTC facilities.

The findings demonstrated that TGDS-15 scores were positively correlated with both OHAT total scores and OHF counts. In other words, residents with poorer overall oral health and greater oral functional impairment tended to report more severe depressive symptoms. These results align with previous research indicating an interrelationship between oral health and mental health in later life (Ohi et al., 2022; Porter et al., 2015). Longitudinal studies further support the association between oral health status and changes in depressive symptoms over time, underscoring the potential clinical relevance of this relationship (Kunrath & Ribeiro Silva, 2021).

Several mechanisms may help explain these associations. Poor clinical oral health may contribute to oral pain, discomfort, dissatisfaction with the mouth, and reduced oral health-related quality of life, all of which may negatively affect emotional well-being in older adults (Porter et al., 2015; Wong et al., 2019). In parallel, oral hypofunction may impair chewing, swallowing, and speaking, which are essential not only for nutrition but also for everyday communication and social participation (Minakuchi et al., 2018). Functional deterioration of the oral cavity and changes in orofacial appearance have also been reported to mediate the relationship between tooth loss and depression, suggesting a plausible pathway linking oral impairment with reduced self-confidence and depressive symptoms (Kusama et al., 2021).

The social dimension may be particularly relevant in LTC populations. Longitudinal evidence has shown that oral hypofunction is associated with social withdrawal in older adults, while eating-related social isolation has been linked to oral frailty, suggesting that oral and social vulnerabilities may cluster together in later life (Hasegawa et al., 2021; Sakurai et al., 2021; Ohara et al., 2020). In institutional settings, where opportunities for autonomy and social engagement may already be reduced, oral problems that interfere with speaking, smiling, or

eating may further limit participation in shared meals and interpersonal interaction. Such effects may contribute to loneliness, reduced psychosocial well-being, and greater depressive symptoms.

In addition, the dietary pathway may also be important. Poor oral status and reduced oral function may limit the ability to chew a wide variety of foods, potentially leading to decreased meal enjoyment, restricted food choices, and compromised nutritional intake. Because eating is both a biological and social activity in older age, difficulty in chewing or swallowing may affect not only nutritional status but also the pleasure and meaning associated with meals. These combined physical, psychological, and social consequences may help explain why poorer oral health was associated with more severe depressive symptoms in the present study.

The stronger correlation observed between TGDS-15 score and OHAT total score, compared with OHF count, may suggest that visible and symptomatic oral health problems captured by OHAT are more directly perceived by residents and therefore more closely related to emotional distress. As OHAT includes domains such as lips, tongue, gums, saliva, oral cleanliness, and dental pain, it may reflect oral conditions that affect comfort and self-perceived oral health more immediately in daily life (Chalmers et al., 2005). Nevertheless, the significant association between OHF burden and depressive symptoms remains clinically meaningful, as oral functional decline may also reflect broader frailty-related processes and reduced adaptive capacity in later life (Shimazaki et al., 2020; Limpuangthip & Komin, 2023; Oura et al., 2022). In conclusion, these findings support the use of brief oral screening tools in LTC settings. The OHAT offers a feasible method for identifying clinical oral health problems, whereas OHF assessment can capture multidimensional oral functional decline among older adults (Chalmers et al., 2005; Minakuchi et al., 2018). When used alongside depression screening such as the TGDS-15, these tools may help care providers identify residents who may benefit from timely dental evaluation and psychosocial support within a more integrated care pathway (Wongpakaran et al., 2013; Somporn et al., 2012).

Several considerations should be taken into account when interpreting the findings of this study. First, because of the cross-sectional design, the findings reflect associations at a single point in time and do not establish temporal relationships. Second, the study was conducted in two LTC facilities in Bangkok; therefore, the findings may be most applicable to similar institutional settings. Third, although validated assessment tools were used, other factors such as comorbidities, medication use, nutritional status, and functional dependency may also have contributed to the observed relationships. Nevertheless, the study provides useful preliminary evidence on the association between oral health and depressive symptoms among older adults in LTC. Future longitudinal studies may help further clarify these relationships and explore whether improvements in oral health or oral function are associated with better mental health outcomes.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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