

Oral Hygiene Behaviors and Oral Health Literacy Among Informal Thai Workers in Rural Areas

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Abstract

Background: Informal Thai workers experience disparities in accessing health services. Improper oral healthcare behavior is the main cause of oral diseases. Promoting oral health literacy (OHL) is an essential strategy for achieving positive oral health outcomes. This study aimed to investigate OHL, oral hygiene behavior (OHB), and associated factors of OHB among informal Thai workers in a rural context.

Methods: A cross-sectional community-based survey was conducted among 274 informal Thai workers aged 20–59 years. The data were collected through face-to-face interviews with questionnaires. Cronbach's alpha coefficient of the OHL scale was 0.86. Data were analyzed using simple and multiple logistic regression with a 95% confidence interval (CI).

Results: The findings revealed that 138 of the participants (50.4%) had proper OHB, and 46.4% had proficiency in overall OHL. Seven factors were significantly associated with OHB, namely, educational attainment, the job sector, the sufficiency of family income, and three OHL dimensions, including understand, appraise, and apply. However, three predictors of proper OHB were those who attained secondary school and higher education (adjusted odds ratio [AOR]: 2.24, 95% CI: 1.31–3.85) and OHL proficiency in the understand and appraise components (AOR: 2.23, 95% CI: 1.25–4.00 and AOR: 1.98, 95% CI: 1.11–3.52, respectively).

Conclusion: Therefore, public health dental care units should organize activities to improve workers' capacity and ability to exhibit OHB. The OHL promotion program should be developed with an emphasis on providing the public with a detailed understanding of oral hygiene. Dental health education is enhanced by inquiring, verifying, and looking at skills to help them gain the skills and confidence to provide consistent oral care.

Keywords: Oral hygiene, Dental health promotion, Health literacy, Behavioral sciences, Disparities



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Introduction

Tooth loss, that is no teeth for chewing food affects nutrition, socializing, and quality of life and is more common in elderly people, inversely proportional to having fewer permanent teeth. It is mainly caused by caries and periodontitis. Both diseases have a long progression period that accumulates over many years. If treatment is delayed, it can lead to tooth loss in the future. According to the Thailand National Oral Health Survey (2017), working-age adults were found to have an average of 28.4 permanent teeth, while 85.3% had tooth loss. They have an average of 6.6 decayed teeth and an average of 3.6 missing teeth. Approximately 62.4% and 43.3% of them had gum inflammation and untreated decayed teeth, respectively (1). However, it was found that they had average permanent teeth less than functional occlusion when they turned to an elderly person.

The working-age population makes up the majority of the country's population. It is the main force at work, taking care of other age groups and helping to drive the country's economy. In 2019, the Thailand National Statistical Office survey demonstrated that of 37.5 million employees, 54.3% (20.4 million people) are workers who are not protected or have no social security from work. It is called informal labor. More than half of the informal workers working in the agriculture sector accounted for 11.5 million people (56.4%), followed by the trade and services sector at 33.1% and the manufacturing sector at 10.5%, respectively (2). Informal workers are considered vulnerable. They have to work hard and face problems such as low remuneration, intermittent work, a social welfare gap, unequal access to government services, occupational risks, and health impacts. Physical illnesses, including oral health, cause them to take time off work, affecting their



production and family's income, as well as the burden of expenses and time spent on dental services. In addition, if the infection is severe, it may cause disability, damage to other organs, or even death.

Health literacy is one of the frameworks for promoting personal health. It is an ability or skill in intelligence and the social motivation to access, understand, and use the information to promote health and stay healthy for life (3). Several studies have brought the health literacy framework into many health contexts, including oral health. According to the "Integrated model of health literacy" by Sørensen et al, oral health literacy (OHL) refers to oral health information, processes, and the ability to understand information and the basic oral health context to decide to improve oral health (4,5). Previous studies have found that people with low OHL often have inappropriate oral hygiene behavior (OHB) and poor oral conditions (6–9).

In terms of OHB, the report showed that working-age adults used fluoride toothpaste (86.1%), brushed their teeth for at least two minutes (77%), brushed their teeth before bedtime every evening (61.8%), and used dental floss (14.7%). Additionally, 20.2% consumed sugary drinks every day. Therefore, 42.3% utilized oral healthcare services within the past 12 months, and only 15.8% had routine dental check-ups (2). Good oral healthcare behavior is the core activity for decreasing tooth loss from oral diseases. Promoting good oral healthcare behavior in the working-age population is a low-cost solution. However, it is highly effective and decreases the risk of elderly people experiencing oral health problems. OHB is the key to achieving good oral health. OHB implies that continuous self-cleaning of the oral cavity becomes part of daily life. Proper OHB requires knowledge of the application and practice of oral hygiene.

Due to the changes in oral health in the working-age population, a system of oral health promotion involving the working class should be developed to decrease tooth loss in old age and increase their quality of life. This study examines OHL, OHB, and associated factors of OHB among Thai informal workers in the rural context and then recommends further oral health promotion.

Materials and Methods

Study Design and Participants

This is a cross-sectional community-based survey involving informal Thai workers aged 20–59, residing for at least 12 months in the rural area of Sam Chuk District, Suphan Buri Province, Central Thailand, with employment income and under the Universal Coverage Scheme. Students and business owners were excluded from the study. A suitable sample size was calculated using the G*Power program (10), which estimated the sample size for a multiple logistic regression analysis following the recommendations of Hsieh et al (11). Using a three-stage random sampling technique, 271 subjects were required to perform a multiple logistic regression analysis, yielding

an odd ratio of 2.0 with a one-sided significance level of .05 and a power of 0.80. First, seven primary care units were randomly selected from fourteen primary care units. Second, one community was selected by drawing a list from the list of communities in the service area of each primary care unit. Finally, based on sample size, 39–40 individuals were randomly selected from the community. The 274 informal Thai workers willing to participate in this study were asked to sign a consent form.

Research Measurements

A questionnaire was used as a research tool, which was developed based on theories and a literature review. The questionnaire was reviewed and approved for content validity by three experts in the areas of behavioral science, dental public health, and health literacy measurement. A panel of experts rated the scale content validity index (S-CVI) of all instruments at 1.00 and the item content validity index (I-CVI) of all items at 1.00. In the first round of a pilot test, ten informal workers were assessed for face validity. Then, out of thirty participants, the item discrimination index and reliability of the tool were assessed in the second round. The corrected item-total correlation was utilized as an item discrimination index, and Cronbach's alpha coefficient was shown as reliable. The questionnaires used in this study are described as follows:

Socio-demographic Background: The general characteristics of the participants were obtained using seven items, consisting of multiple-choice and short-answer questions concerning gender, age, educational attainment, marital status, sufficiency of family income, job sector (work), and oral health insurance scheme.

The Oral Health Literacy Scale (OHLS): This scale was developed based on the work of Sørensen et al (4). The four components of OHL consist of access, understand, appraise, and apply regarding oral health information. The OHLS contained 24 items with a 3-point rating scale, ranging from 0 to 2, representing never or probably not, difficult or probably, and easy or definitely. Each component had six items. The overall score for each component is between 0 and 12 points, with a score of 10–12 points indicating proficiency in OHL and a score of 0–9 points demonstrating non-proficiency in OHL. The overall OHL score is between 0 and 48 points, with a score of 38–48 points indicating proficiency and a score of 0–37 points implying non-proficiency. The psychometric properties of the OHLS were satisfactory, with Cronbach's alpha being 0.86. In addition, the corrected item-total correlation ranged from 0.23 to 0.55.

The Oral Hygiene Behavior Questionnaire (OHBQ): It consisted of seven items. The questions on oral cleaning behavior in the past 3 months consisted of four items with a 4-point rating scale, including every day (3), 4–6 days weekly (2), 1–3 days weekly (1), and rarely or never (0). Brushing teeth and replacing toothbrushes encompassed three items with a 4-point rating scale, including usually

(3), sometimes (2), seldom (1), and never (0). The overall OHB raw score range was 0–21 points and was converted to a percentage score. The level of OHB, namely, the overall OHB percentage score was categorized according to cutoff points of 60–100 and 0–59.99, indicating proper and poor OHB, respectively.

Data Collection

The required data were collected between November and December 2020. After obtaining the approval of the institutional review board, the researcher and two well-trained data collectors met the participants, described the study objectives and procedures, and informed them of their rights and protection. Signed informed consent was obtained from all participants who were willing to participate. The participants spent about 10–15 minutes in face-to-face interviews with questionnaires. However, the participants were informed that they could withdraw at any time if they preferred to leave or felt uncomfortable during the interview.

Data Analysis

All the data were analyzed using the Statistical Package for the Social Sciences, version 18 (SPSS, Chicago, IL). The data were presented as frequencies, percentages, means, and standard deviations (SD). A simple logistic regression analysis was performed to examine the association between dependent variables and proper OHB. Only the significant variables in the simple logistic regression were entered into the multiple logistic regression analysis using the forward likelihood ratio method. Crude and adjusted odd ratios (COR and AOR) with a 95% confidence interval (CI) were used to determine the strength of the association. Statistical significance was set at a *P* value of less than .05.

Results

Of the 274 informal Thai workers participating in the study, 58% were female, aged 22–59 years old, and had an average age of 46.52 ± 9.85 years. Almost 70% of informal workers were married, while 3 out of 5 graduated from secondary school or higher. About 2 in 3 participants worked in the industrial or service sectors, and the remaining participants worked in the agricultural sector. Additionally, about 7 out of 10 participants had a sufficient family income.

Oral Hygiene Behaviors

Informal workers with proper OHB accounted for 50.4% (Mean \pm SD: 72.9 ± 8.1), while 49.6% had poor OHB (Mean \pm SD: 46.0 ± 8.7). Most participants hardly practiced “using dental floss to clean between teeth at least once a day.” “Tongue cleaning after tooth brushing” was a rare practice in the poor OHB group, while those in the proper OHB group practiced regularly. When asked about brushing with a modified bass brushing technique, 63.5% of participants at the poor OHB level brushed incorrectly

compared to those at the proper OHB level. Furthermore, when asked about brushing for at least two minutes, participants with proper OHB practiced slightly more than those who had poor OHB (Table 1).

Oral Health Literacy

Participants had a proficient overall OHL of 46.4% (Mean \pm SD: 35.3 ± 8.7). Additionally, they were found to be proficient in OHL for apply, followed by access, appraise, and understand with 57.7%, 50.7%, 47.1%, and 46.7%, respectively. Apply had the highest rate among all average scores (9.6 ± 2.3), followed by understand (8.9 ± 2.5), appraise (8.8 ± 2.7), and access (8.1 ± 3.8) components, respectively (Table 2).

Factors Associated With Oral Hygiene Behavior

Factors significantly associated with OHB were age, educational attainment, job sector, sufficiency of family income, and the three components of OHL, namely, understand, appraise, and apply (*P* value < 0.05). Informal workers who attained secondary school or higher education were about three times more likely to have proper OHB than those with only primary school education (COR: 3.10, 95% CI: 1.86–5.14). Participants aged 20–49 years were almost 2.5 times as likely to result in proper OHB (COR: 2.29, 95% CI: 1.41–3.72). Workers with sufficient family income were about twice as likely to have proper OHB (COR: 1.82, 95% CI: 1.09–3.05). Similarly, almost twice as many participants worked in the industrial or service sectors (COR: 1.72, 95% CI: 1.06–2.80). From the OHL perspective, workers with proficiency in OHL according to the understand, appraise, and apply components were 3.70 (COR: 3.70, 95% CI: 2.24–6.11), 3.35 (COR: 3.35, 95% CI: 2.04–5.51), and 2.56 (COR: 2.56, 95% CI: 1.56–4.19) times more likely than those with non-proficiency in proper OHB, respectively. On the other hand, the participants' gender and the access component of OHL had no significant association with their OHB (*P* value > 0.05, Table 3).

Seven significant variables were entered into multiple logistic regression analysis with the forward likelihood ratio method. Only three considerable factors were found to predict proper OHB. The results revealed that more than two times as many informal workers who attained secondary school or higher education were likely to result in proper OHB (AOR: 2.24, 95% CI: 1.31–3.85). Moreover, approximately twice as many participants with proficiency in OHL according to the understand and appraise components (AOR: 2.23, 95% CI: 1.25–4.00, AOR: 1.98, 95% CI: 1.11–3.52, respectively) had proper OHB (Table 3).

Discussion

The present study focused on assessing OHB and its predictors among informal Thai workers in the rural area. The findings showed that about half of informal Thai workers had improper OHB. Three influencing factors of

Table 1. Means and SD of OHB by the OHB Level

Items	Level of OHB, Mean \pm SD		P Value ^a
	Proper (n=138)	Poor (n=136)	
1. Tooth brushing after waking up/before breakfast	2.9 \pm 0.3	2.7 \pm 0.7	<0.001
2. Tooth brushing before going to sleep	2.7 \pm 0.7	2.3 \pm 0.9	<0.001
3. Tongue cleaning after tooth brushing	2.5 \pm 1.0	0.6 \pm 1.1	<0.001
4. Cleaning between the teeth by using dental floss at least once a day	0.9 \pm 1.3	0.3 \pm 0.8	<0.001
5. Replacing toothbrush every three months or less	2.7 \pm 0.8	1.4 \pm 1.5	<0.001
6. Tooth brushing with a modified bass brushing technique	2.0 \pm 1.1	1.3 \pm 0.9	<0.001
7. Tooth brushing for at least 2 minutes	1.6 \pm 0.8	1.1 \pm 0.7	<0.001

Note. OHB: Oral hygiene behavior; SD: Standard deviation; Full marks=3 points.

^a Independent samples t-test.

Table 2. Means and SD of OHL by the OHB Level

Component of OHL	OHL Level: n (%)		Overall (n=274)	Mean \pm SD of OHL	
	Proficient	Non-proficient		Proper OHB (n=138)	Poor OHB (n=136)
Access	139 (50.7)	135 (49.3)	8.1 \pm 3.8	8.5 \pm 3.6	7.6 \pm 4.0
Understand	128 (46.7)	146 (53.3)	8.9 \pm 2.5	9.7 \pm 2.2	8.1 \pm 2.5
Appraise	129 (47.1)	145 (52.9)	8.8 \pm 2.7	9.5 \pm 2.4	8.0 \pm 2.7
Apply	158 (57.7)	116 (42.3)	9.6 \pm 2.3	10.2 \pm 2.1	9.0 \pm 2.3
Overall OHL	127 (46.4)	147 (53.6)	35.3 \pm 8.7	37.9 \pm 8.1	32.7 \pm 8.7

Note. SD: Standard deviation; OHB: Oral health behavior; OHL: Oral health literacy.

proper OHB were those who attained secondary school or higher education and OHL proficiency in the understand and appraise components, respectively.

Oral hygiene through routine tooth brushing alone may not be sufficient to clean the oral cavity. Cleaning other areas, including brushing the tongue and using tools such as dental floss to clean interdental spaces, prevents the accumulation of microorganisms that can cause tooth decay and gingivitis. Therefore, improper behavior or a lack of continuity can lead to oral problems. Cleaning the mouth is a highly detailed activity, requiring significant time and attention. In particular, three-quarters (77.7%) of informal workers did not floss, and 43.1% of them did not brush their tongues. It could be mentioned that informal workers did not realize the importance of flossing. They misunderstand that brushing teeth with toothpaste to clean the mouth is sufficient to maintain good oral health. Oral health education in the past may have provided plain knowledge or taught tooth brushing but lacked important things like brushing to cover every teeth and every sides of teeth, positioning the bristles and wrist movement including not practicing the skills of brushing teeth and using dental floss (1). A national survey of Portuguese adults aged 15 and older demonstrated that 97.6% brushed their teeth daily, 72.2% brushed twice daily or more, and 23.3% flossed (12). Based on the findings of a study in Iran among adults aged 35 and older, 65.5% brushed their teeth twice a day or more, 15.9% flossed, and only 7.6% flossed daily (13). Furthermore, the results of an Australian study of adults aged 18 and older revealed that 66.8% brushed their teeth at least twice a day, 42.6% brushed their tongue daily, and 30.1% flossed daily (14).

In this current study, about 45% of informal workers had proficiency in overall OHL, which contradicts the results of a study in Brazil involving adults aged 20–64 years; furthermore, only 29.5% of the sample had high OHL (15). According to the findings of a study in Iran with adults aged 18 years and older, 62.5% had adequate OHL (13). The overall OHL levels were different, so two main points of discussion arose, including (1) the issue of OHL measurements and different categorization criteria. Some studies have focused on measuring spelling skills and reading about oral health. In this study, OHL was obtained from the general information provided by people on their activities in daily life. There is a small percentage of specific information that informal workers misunderstand, which affects their decisions. Some studies have classified OHL based on similar studies (15,16). Others were based on the median scores of the sample (9). Therefore, the OHL assessment in each study and the categorization criteria contributed to the differing results of the studies. (2) The characteristics of the samples in each study, even if they were of the same working age but in different occupations and different types of work, including the economic status of the sample, is another reason for the variation in results on the level of OHL.

It was found that educational attainment and two components of OHL, such as understand and appraise, affected their OHB. Individuals who had higher educational levels had more opportunities to gain health knowledge in detail and more chances to access oral health information through many sources, which made them more understanding and led to proper application and utilization. Moreover, long-life learning enhances the

Table 3. Factors Associated With Proper Oral Hygiene Behaviors Among Informal Workers

Variables	OHB, n (%)		COR (95% CI)	AOR ^a (95% CI)
	Overall	Proper		
Gender				
Female	159 (58.0)	81 (50.9)	1.06 (0.65–1.71)	
Male	115 (42.0)	57 (49.6)	1	
Age (Years)				
20–49	137 (50.0)	83 (60.6)	2.29 (1.41–3.72)**	
50–59	137 (50.0)	55 (40.1)	1	
Educational attainment				
Secondary school or higher	167 (60.9)	102 (61.1)	3.10 (1.86–5.14)***	2.24 (1.31–3.85)**
Primary school	107 (39.1)	36 (33.6)	1	1
Job sector				
Industrial or services sector	163 (59.5)	91 (65.9)	1.74 (1.04–2.92)*	
Agricultural sector	111 (40.5)	47 (34.1)	1	
Family income				
Sufficient	187 (68.2)	103 (55.1)	1.82 (1.09–3.05)*	
Insufficient	87 (31.8)	35 (40.2)	1	
OHL: Access				
Proficient	139 (50.7)	72 (51.8)	1.12 (0.69–1.81)	
Non-proficient	135 (49.3)	66 (48.9)	1	
OHL: Understand				
Proficient	128 (46.7)	86 (67.2)	3.70 (2.24–6.11)***	2.23 (1.25–4.00)**
Non-proficient	146 (53.3)	52 (35.6)	1	1
OHL: Appraise				
Proficient	129 (47.1)	85 (65.9)	3.35 (2.04–5.51)***	1.98 (1.11–3.52)**
Non-proficient	145 (52.9)	53 (36.6)	1	1
OHL: Apply				
Proficient	158 (57.7)	95 (60.1)	2.56 (1.56–4.19)***	
Non-proficient	116 (42.3)	43 (37.1)	1	

Note. OHL: Oral health literacy; AOR: Adjusted odds ratio; CI: Confidence interval; COR: Crude odds ratio. ^aResults from binary logistic regression analysis with the forward likelihood ratio method. **P* value < 0.05, ***P* value < 0.01, ****P* value < 0.001; 1 = Reference.

ability to think and make a decision to behave appropriately, which is more common among high school or higher education graduates. Many previous studies found that higher educational levels brought studies' subjects more proper OHB (17–19). In addition, respondents with proficient OHL can experience proper OHB. As explained by the health literacy framework of Sørensen et al, informal workers could find oral health information that they are interested in, understand information, evaluate risks and benefits, and apply this information to make decisions (4). It made informal workers gain correct knowledge, perceive the risks and impacts of oral diseases, and realize the importance of good oral health. Thus, they could have appropriate behaviors or good practices if they wanted to be protected from oral diseases. The findings of previous studies in Japan and Brazil showed OHB-related OHL among study respondents (6,15).

The present study had several limitations. First, data were collected only from rural communities within a single district in Central Thailand; therefore, the findings

may not be generalizable to the entire population of informal workers. Then, future studies should compare OHB among informal workers in rural and urban contexts in several settings. Second, our cross-sectional study was performed to assess their OHB and OHL without dental status or oral health-related quality of life, which were the oral health outcomes. Moreover, a cross-sectional design study cannot determine causal relationships but only associations and correlations. Further studies, including a prospective cohort study, should be conducted and adopt their oral health status in order to better understand how OHB and OHL affect their oral health outcomes. Finally, in the present study, the association of demographic data, socioeconomic status, OHL, and OHB among informal workers was assessed only by interviews with a questionnaire by researchers. Thus, it is recommended that a qualitative phenomenon study be used in future investigations to explore the process of OHL improvement, problems, challenges, and causes of improper OHB. It will

be beneficial to understand and conduct activities aimed at decreasing oral health problems further.

Conclusion

In this study, half of the informal workers had a proper OHB level, and more than half had a non-proficient OHL. Additionally, educational attainment, the understand and appraise components of OHL were vital factors affecting OHB. Therefore, public health dental units should organize activities to improve the capacity and ability of informal workers to improve their OHB. An OHL promotion program should be set up and operated. Regarding information relating to oral healthcare, risk factors, and oral diseases, workers should be allowed access to reliable data sources, including truthful data. Furthermore, there should be organized activities to appraise and apply components to improve the distribution of oral health information for informal workers to reinforce good oral health in the future.

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Authors' Contribution

Conceptualization: Wirin Kittipichai.

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Formal analysis: Wirin Kittipichai.

Investigation: Nattakarn Phakayawong.

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Project administration: Nattakarn Phakayawong.

Resources: Nattakarn Phakayawong.

Software: Wirin Kittipichai.

Supervision: Wirin Kittipichai.

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Visualization: Wirin Kittipichai.

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Competing Interests

The authors declared no potential conflict of interests with respect to the research, authorship, and/or publication of this article.

Ethical Approval

This study was approved by the Ethics Review Committee for Human Research, Faculty of Public Health, Mahidol University (COA No. MUPH 2020–132, protocol No. 144/2563 approved on October 28, 2020). The study was conducted in accordance with the Declaration of Helsinki.

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