Not Chewing Food among the Thai Elderly with Complete Denture

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Objective: *The study aims to investigate the use of a complete denture in terms of not chewing food and determining the strength of association between not chewing food and several potential risk factors among the Thai elderly.*
Material and Method: *Under the support of the "Khao Aroi" or "Delicious Rice" or "Dental Implant" Project of Institute of Dentistry, Department of Medical Services, Ministry of Public Health, and in co-operation with the Ministry of Science and Technology during 2007-2011, a cross-sectional survey by multi-stage cluster sampling was conducted in 2008, in 21 provinces, 87 hospitals, with 2,676 Thai elderly. The sample was drawn from a sampling frame of 58,043 target Thai people aged 60 years and over, under the Dental Prosthesis Service Campaign (DPSC) project during 2005 and 2007. All Thai elderly, who received a complete denture from the DPSC project at least three months prior, were surveyed from May to October 2008 through questionnaires. Data were analyzed by a set of descriptive analyses and binary logistic regression models.*
Results: *Not chewing food among the Thai elderly, after receiving a complete denture, was 12.5%, quite a bit more effective than ordinary work. Nontaluck found 38% for the proportion not wearing dentures in the 30-baht health care program. This finding is confirmed by the work of Dalodom et al that the use of dentures by Thai elderly was 93% in the DPSC project. The important risk factors that influenced not to chew food were satisfaction with dentures, patient's satisfaction with the denture fitting and care, while controlling the amount of dentures, respectively.*
Conclusion: *Satisfaction of patients with their dentures, good oral health care in fitting denture work, and good communication between dentists and patients are important keys affecting the use of dentures.*

Keywords: *Not chewing food, Thai elderly dentures, Implants, "Khao Aroi" or "Delicious Rice" project, Dental prosthesis service campaign project*

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The proportion of the elderly population continues to grow worldwide, especially in Asian countries such as Thailand. The National Statistical Office[1] reported that the proportion of Thai people aged 60 years and over rose from 6.8% in 1994 to 9.4% in 2003 and to 10.7% in 2007. The increasing trend of a higher number of aging people will bring a significant impact on health problems, especially chronic diseases related to elderly people. The oral health problem is also fast becoming a leading cause of trouble and disability in the elderly.

For oral health problems among the elderly people, more individuals tend to preserve their natural teeth but the oral health statistics show high, marked levels of tooth loss. The National Oral Health Survey on Thai people aged 60-74 in 2000-2001, performed by the Dental Health Division, Department of Health, Ministry of Public Health, reported that 5.7 million elderly people (95%) lost at least one tooth[2]. From this number, more than 3.7 million people (71%) wished to use dentures to replace their missing teeth. Nevertheless, 1.0 million people (18%) could actually afford dentures, since most Thai elders were poor and

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did not make a lack of dentures a top priority over other essential needs. Normally, the cost of dentures is high, about 15,000 to 20,000 baht. Consequently, they faced some troubles chewing food, leading to some changes of living conditions, lifestyle, and quality of life. Additional results from this survey estimated the number of elderly persons that had no teeth left (complete loss of teeth) and wished to have a complete denture, was at 300,000 people (8% of the Thai elderly).

To alleviate the problem of elderly losing all of their teeth, the Dental Health Division, Department of Health, Ministry of Public Health[3,4] implemented the Dental Prosthesis Service Campaign (DPSC) Project during 2005-2007 by providing free dentures in connection with the auspicious occasion of His Majesty the King's 80th Birthday Anniversary on December 5th 2007. Furthermore, the Institute of Dentistry[5], as a unit of the Department of Medical Services, Ministry of Public Health, in co-operation with the Ministry of Science and Technology, proposed the "Khao Aroi" or "Delicious Rice". It was referred to as the "Dental Implant" Project of 2007-2011. It provided free implants to underprivileged elderly people who were toothless or have had problems with loose dentures. The name of the project "Khao Aroi" was inspired by King Bhumibol Adulyadej's comment that "toothless people do not enjoy food and thus feel unhappy. When the heart does not feel happy, the body won't be strong". However, because of the specific technology required for implants and the high cost of about 100,000 baht per patient, there have been no more than 10,000 people receiving "Khao Aroi" implants from this project. Customarily, any royal project for Thai people is considerably auspicious and more likely to be of higher quality, more effective, more impressive, and have a greater impact.

This paper as a part of the "Khao Aroi" or "Dental Implant" Project from the Institute of Dentistry, Department of Medical Services, Ministry of Public Health, wished to determine background data in the use of dentures among Thai elderly who have received a complete denture from the DPSC project. The use of dentures does not only depend on the quality and problems of dentures, but also depends on patient satisfaction, quality of health services, and the skill of dentists. Consequently, the following risk factors, e.g. quality of dentures, satisfaction of patient with dentures, chewing ability, irritation and pain obtained from dentures, number of dentures, denture care by dentists, and oral health services, might determine a solid relationship with the use of dentures[6-8]. If patients receive free dentures from the DPSC project and they do not use them for chewing food, it seems wasteful. For the reasons mentioned above, the authors take this opportunity to address the gaps for determining the use of complete denture in terms of not chewing food among aging Thai people.

Material and Method

Study design and sampling methods

A cross-sectional survey was conducted from May to October 2008 in order to study the strength of association between several potential risk factors and the use of a complete denture in terms of not chewing food under the support of the "Khao Aroi" or "Delicious Rice" project. The sampling frame containing 58,043 target Thai people aged 60 years and over was obtained from the Dental Prosthesis Service Campaign (DPSC) project. The inclusion criterion was that participants received a free complete denture from the DPSC project at least 3 months prior.

Multi-stage cluster sampling was applied for selecting Thai elderly people after approval from the Ethical Committee for Human Research of the Ministry of Public Health with the approved number 57/2008. Briefly, 21 provinces out of 76 provinces in Thailand were drawn in proportion to size; then within each primary sampling province, 1-4 hospitals were selected randomly with 87 hospitals being involved. Finally, within each secondary sampling hospital, 30-40 patients, who had received a complete denture at least 3 months prior, were chosen at random. The formula to determinate sample size under multi-stage sampling was obtained by[9]

$$n = \frac{Z^2_{\alpha/2} N\sigma^2}{Z^2_{a/2}\sigma^2 + (N-1)d^2} \text{ x design effect}$$

where n denoted the estimated sample size, N was the population size (58,043) under the above sampling frame, $\sigma^2 = p(1-p)$ denoted the variance of the use of dentures in which the estimated proportion p of wearing dentures under the 30-baht health care program from the work of Nontaluck[10], was 62%. The precision of estimation or the acceptable error d = p-p was assigned to be 3%, $Z_{\alpha/2}$ was the 100 $(1-\alpha/2)^{th}$ percentile of standard normal distribution where $Z_{.025} = 1.96$. Design effect defined by the variance ratios of p under the complex sampling divided by the simple random sampling was assigned to be 2.5. The calculated sample size was 2,462 whereas the actual size was 2,676. Indeed, the estimated sample sizes were computed from several formulae and variables based also on the statistical analysis used; however,

the authors finally selected such a case to present with the most practical sizes and reasons.

Interview and questionnaire

An interview was necessary for some Thai elderly who were not able to read functionally and write. Respondents were appointed in advance to their nearest service centers to give information. Ten interviewers, including researchers, were trained for visits to each center to complete the questionnaire before data collection. The interview questionnaire consisted of socio-demographic factors, the expectations of wearing dentures, denture use experience, problems and functions of denture use, the oral health impact profile (OHIP), patient's satisfaction (SATIS) with dentures, oral health services and communication between dentist and patient.

The OHIP was a scaled index of the oral health conditions related to the quality of life and the oral disorder during the months prior to the interview. The first, original 49 OHIP statements was constructed by Slade and Spencer[11] in 1994; later there were some modified short versions proposed by other scientists[12-16]. In the present study, the original Canadian OHIP developed by Awad et al[17] contained 20 negative statements and it was translated into Thai with a forward-backward approach by four translators. The forward translation into Thai was performed by two independent, professional dentists. One of them was a foreign dentist whose native language was English but he had been living in Thailand for more than 10 years; the other was a Thai dentist who had spent most of his professional life in an English-speaking country. Two forward resulting translations were compared, debated, and synthesized into one common version by expert teams, consisting of dental researchers, an epidemiologist, two biostatisticians, and a psychologist. The results were translated back into English by two independent, professional dentists like the forward process again. Finally, the resulting OHIP could be obtained after conclusion and discussion by the expert teams. The OHIP was divided into 7 subscales containing functional limitation (3 items), physical pain (3 items), psychological discomfort (3 items), physical disability (4 items), psychological disability (2 items), social disability (3 items), and handicap (2 items). Because of all negative statements, the OHIP scale rated reverse scores on 6-point ordinal scales ranging from never (6), rarely (5), occasionally (4), some of the time (3), and most of the time (2), to always (1). Thus, the higher OHIP score indicated a better quality of life.

Usually, patient satisfaction involves personality traits, emotional factors, denture quality, and the dentist-patient relationship. But, the investigation of Bolender et al[18] showed poor results with a low degree of discrimination of the evaluation system and they further suggested that patients' appreciation for their dentures might be collected by using a complaint questionnaire. The SATIS originated by Vervoorn et al[19] was a complaint questionnaire designed to measure several aspects of denture satisfaction. This original English-language SATIS was translated into Thai with a forward approach like the OHIP. The SATIS consisted of 40 complaint questions and 6 overall positive statements. 40 complaint questions were separated into 5 components categorizing as functional complaints of the maxillary denture (12 items), functional complaints of the mandibular denture (8 items), vague denture complaints (11 items), aesthetic complaints "too hollow" (5 items), and aesthetic complaints "too bulbous" (4 items). Each item of 40 complaint questions was rated reversely on a four-point scale by the subjects themselves (4 = not at all; 3 = a little; 2 = quit a lot; 1 = extremely a lot). The items of 6 overall positive statements of satisfaction were rated on a five-point scale (4 = very satisfied; 3 = satisfied; 2 = neither satisfied nor dissatisfied; 1 = dissatisfied; 0 = very dissatisfied). Therefore, the higher score of SATIS including both 40 negative items and 6 overall items showed a higher satisfaction.

The questionnaire was pre-tested two times, each time done at two hospitals in Ratchaburi with 20-30 elderly patients per hospital. Content validity of OHIP and SATIS was examined by 4 experts with forward and backward translations as mentioned earlier. Convergent or criterion related validity of OHIP had been tested by correlation between its various subscale scores and the overall score, whereas, the convergent validity of SATIS was tested by correlating the several subscale scores of 40 items with the overall score of 6 items. Construct validity of SATIS was evaluated by using confirmatory factor analysis with the real observed data. See more details on the construct validity of SATIS in the work of Thamsoonthorn et al[20] whereas the construct validity of OHIP will appear sooner. Reliability of instruments was examined in both the pretest phase and real observed data phase. All coefficients including Cronbach's alpha, Split-half, and Guttman of OHIP and SATIS were excellent ranging from 0.82 to 0.92. Respondents gave information related to above variables during the past 1-month before

interviews.

Statistical analysis

Descriptive statistics were used to describe the sample characteristics. Statistical models called the binary logistic regression both of simple and multiple procedures were adopted to identify potential predictors including the violation of checking of assumptions. The binary logistic models, depending on Y: the use of a complete denture as dichotomous outcomes (coded as 1 = not chewing food, 0 = chewing food), were employed by the associated predictors

$$\text{log-odds} = \log\left[\frac{p}{1-p}\right] = \log\left[\frac{P(Y=1)}{P(Y=0)}\right] = \alpha + x'\beta$$

The odds ratio of not chewing food for receiving versus is computed as,

$$\text{OR}(Xi, Xi = \frac{p_i/(1-p_i)}{p_{i*}/(1-p_{i*})} = \frac{P(Y_i = 1/x_i)/P(Y_i = 0/x_i)}{P(Y_{i*} = 1/x_{i*})/P(Y_{i*} = 0/x_{i*})} = \exp((X_i - X_{i*})'\beta)$$

The crude odds ratios with p-value less than 0.1 from the simple logistic regression were performed to reduce the number of independent variables in a screening step, whereas, the adjusted odds ratios from the multiple logistic regression were employed to assess the potentially useful predictors in a step of building the best appropriate model.

To compare various fitting models to the actual data, the higher pseudo-R^2, the lower AIC (Akaike Information Criterion), and the lower BIC (Baysian Information Criterion) were adopted as the criteria in selecting the better fitting model. Alternatively, suppose that the model ω with parameter β_1 were nested in the full model Ω with parameter $\beta = (\beta_1, \beta_2)$, in testing H_0: $\beta_2 = 0$ or equivalent to the null model ω with β_1 being well in fitting the data, if $D > \chi^2_{p-r}$ where $D = -2 \log \lambda = -2 \log L(\omega) - (-2 \log L(\Omega))$ denoted the log-likelihood ratio statistic, p - r was the degree of freedom of Chi-square χ^2 test, p and r were the number of parameters of the model Ω and the model ω, respectively, then the conclusion of rejecting of H_0 indicated that the null model ω was rejected and the full model Ω was better than the reduced model ω in the goodness-of-fit criterion.

Results

Characteristics

A total of 2,676 Thai elderly wearing complete dentures were recruited in this study; half of them were male (49.2%); the average age was 71.8 (SD = 6.1) years old, ranging from 59 to 96 years. Sixty-three percent (63.1%) of the subjects were married and 30.7% were widowed. Approximately 80.7% had a primary school level of education. About 31.0% were in debt, 45.5% had sufficient money and no debt, and 23.5% had sufficient money and savings. More than 62% were unemployed/retired persons, 23.3% were farmers/agriculture persons, 7.3% were laborers and 6.9% were government/enterprise officers. Most of them had at least one chronic disease (75.5%): 44.7% had hypertension, 28.7% eye disease, 26.6% osteoarthritis, 20.2% diabetes, 16.0% lipoprotein diseases, 9.5% heart and cardiovascular diseases. Almost all (99.8%) of elderly were able to do daily self-help activities.

For the use of the complete denture, the proportion of respondents not chewing food was 12.5%. The time duration period of less than 6 months of chewing food was 15.4% while 32.4% were between 6 months to 1 year, 35% were between 1 to 2 years, and 12.3% were greater than 2 years. The average age at the first-ever use of the denture was 64.6 (SD = 10.8) years old; the average amount (quantity) of dentures per patient was 1.1 (SD = 0.3) units including this free complete denture. Only 9.9% of elderly people had two units or more of dentures.

The oral health impact profile (OHIP) containing 20 statements ranged from 1 to 6 scales and indicated a good quality of life with a high total mean score of 5.42 (SD = 0.66). Seven subscale components were 4.69 (SD = 1.33), 5.42 (SD = 1.04), 5.53 (SD = 0.98), 5.06 (SD = 1.00), 5.76 (SD = 0.66), 5.92 (SD = 0.34), 5.90 (SD = 0.45) for functional limitation (3 items), physical pain (3 items), psychological discomfort (3 items), physical disability (4 items), psychological disability (2 items), social disability (3 items), and handicap (2 items), respectively.

Patient satisfaction with dentures (SATIS) consisting of 40 complaint questions ranging from 1 to 4 scales illustrated a high satisfaction with the high total mean score of 3.83 (SD = 0.21). Five subscale components were 3.80 (SD = 0.34), 3.60 (SD = 0.55), 3.90 (SD = 0.16), 3.96 (SD = 0.15), 3.98 (SD = 0.10) for functional complaints of the maxillary denture (12 questions), functional complaints of the mandibular denture (8 questions), vague denture complaints (11 questions), aesthetic complaints "too hollow" (5 questions), and aesthetic complaints "too bulbous" (4 questions), respectively. Consistently, 6 overall positive statements of satisfaction were high as well.

Communication between dentist and patient in the early stage of fitting dentures was the following. 94.8% of the dentists recommended wearing dentures to the patient. About 59.1% of patients were referred to cure denture problems. The proportion of patients who

faced at least one problem of denture fitting was 74.8%. At a rate of 95.6%, dentists were admired by patients for their work in fitting dentures. After using dentures, some patients held regular meetings with their dentist (17.1%).

Relationship

In some fields, theory can aid in selecting the potentially useful independent variables to build a best appropriate model; however, in this research area it is relatively rare. Obviously, the authors had a large number of independent variables and the authors wished to find some useful predictors to describe the response variable. To reduce the number of independent variables by screening out some useless predictors, the authors employed a simple logistic regression model to assess each candidate. The p-value of the Wald test statistic less than 0.1 was used as at a screening criterion to select each potentially useful predictor in its contribution.

After successfully reducing the number of independent variables, a small number of the potential independent variables associated with the use of dentures (not chewing food) consisted of education, religion, health problems related to lipoprotein and thyroid, number of persons living at home, age at first denture usage, number of dentures, problem on fitting dentures, regular meetings with dentist, patient satisfaction with dentist on his/her fitting denture work, OHIP, and SATIS. All 12 successful screening predictors were presented in Table 1.

Then, we modeled almost all subsets of these 12 screening predictors to find an appropriate subset via the multiple logistic models. A variety of computerized approaches, such as forward, backward, and enter, allowed specifying how potential predictors were entered into the models. Fortunately, the selection process between forward and backward yielded the same predictors. With the criteria of the highest pseudo-R^2, the lowest AIC, and the lowest BIC, we obtained a single subset of predictors as the best additive model. The best additive model contained the number of persons living at home, the number of dentures, patient satisfied with dentists' work in the initial fitting of denture stage, and SATIS, All 4 potential risk factors are presented in Table 2.

Next, before concluding the final logistic regression model, we investigated the curvature and the interaction effects more fully. Since the result was insignificant for the interaction effect coefficients, the final logistic model coincided with the best additive model. Finally, residual and diagnostic checks were provided for detecting model inadequacy, outliers, influential observations, and multi-collinearity. Fortunately, the authors did not face these problems. Here, the final logistic model showed that satisfaction with dentures (satis), patient satisfaction with dentist on his/her fitting of dentures (dentist), the number of dentures (numdenture), and two indicator variables of the number of persons living at home (numliving(1) and numliving(2)) affected not chewing food through the logistic model:

$$\log\left[\frac{P}{1-P}\right] = 1.414 - 1.137\,\text{satis} + 1.005\,\text{dentis} + 0.664\,\text{numdenture} + 0.095\,\text{numliving(1)} + 0.512\,\text{numliving(2)}$$

From the final model, satis and numdenture were continuous predictors, and dentist was the risk factor, whereas numliving(1) and numliving(2) might be confounders with indicator coding.

The most important factor that influenced not chewing food was SATIS with the highest value of its coefficient, ignoring the negative sign. The odds ratio of not chewing food decreased 0.32 (exp (-1.137)) times (or the odds ratio of chewing food increased 3.13 times) for a 1-score increase in SATIS after holding other predictors constant. The alternative interpretation for a change of SATIS score from 3.0 to 3.5 was that an occurrence of not chewing food in persons with total mean 3.0 scores of SATIS was 0.566 (exp (0.5x -1.137)) times less than those with total mean 3.5 scores while controlling other predictors. Not chewing food in patients who were not satisfied with their dentists' fitting of dentures in the initial stage was 2.73 (exp (1.005)) times more than those of patients who were satisfied with their dentists when covariates were controlled or adjusted. The comparison among amounts of dentures showed that the odds ratio of not chewing food for patients with several dentures was 1.94 times ($p<0.001$) higher than those of patients with a single denture while controlling other covariates. Moreover, in comparison with the number of persons living at home, the odds ratio of not chewing food increased 1.67 times ($p=0.021$) for a house containing 7 persons and greater, and increased 1.10 times ($p=0.510$) for a house containing 1-4 persons when they were compared to the reference house containing 5-6 persons.

Discussion

For the use of the complete denture in terms of chewing food under the support of the "Khao Aroi" project to celebrate His Majesty the King's 80th Birthday

Table 1. Screening risk factors associated the use of denture (% not chewing food)

Factors	% not chewing	β	Std. Err.	p-value	Crude OR	95% CI
Education						
Not learning	15.0	0.27	0.18	0.128	1.31	0.92-1.85
Primary	11.9	-	-	-	1	1
Secondary and upper	15.7	0.33	0.20	0.100	1.40	0.94-2.03
Religion						
Others	18.6	0.48	0.28	0.089	1.62	0.93-2.82
Buddhism	12.4	-	-	-	1	1
Lipoprotein disease						
Yes	16.2	0.34	0.17	0.044	1.41	1.01-1.96
No	12.1	-	-	-	1	1
Thyroid disease						
Yes	23.3	0.75	0.44	0.087	2.11	0.90-4.98
No	12.6	-	-	-	1	1
Number of persons living in house						
≥7	17.2	0.51	0.22	0.020	1.66	1.09-2.54
5-6	11.1	-	-	-	1	1
≤4	12.5	0.14	0.14	0.330	1.14	0.87-1.50
Age at first using denture	12.5	-0.01	0.01	0.011	0.98	0.97-0.99
<59	17.1	0.48	0.15	0.002	1.61	1.19-2.18
60-69	11.0	-0.03	0.14	0.847	0.97	0.74-1.28
≥70	11.3	-	-	-	1	1
Number of dentures	12.5	0.77	0.14	<0.001	2.17	1.66-2.84
≥2 sets	25.2	1.03	0.16	<0.001	2.81	2.07-3.82
1 set	10.7	-	-	-	1	1
Problem on fitting denture						
Yes	15.9	2.36	0.21	<0.001	10.6	7.01-15.9
No	11.1	-	-	-	1	1
Regular meeting with dentist						
Yes	16.9	0.54	0.21	0.009	1.72	1.14-2.59
No	11.4	-	-	-	1	1
Patients satisfied with dentist on his/her fitting denture						
No	33.1	1.34	0.21	<0.001	3.83	2.56-5.73
Yes	11.4	-	-	-	1	1
OHIP						
Overall mean	12.5	-0.41	0.08	<0.001	0.67	0.57-0.77
Functional limitation		-0.15	0.04	<0.001	0.86	0.79-0.94
Physical pain		-0.57	0.06	<0.001	0.56	0.50-0.64
Psychological discomfort		-0.22	0.05	<0.001	0.80	0.73-0.89
Physical disability		-0.19	0.05	<0.001	0.82	0.74-0.92
Psychological disability		-0.92	0.09	<0.001	0.40	0.33-0.47
Social disability		-0.54	0.13	<0.001	0.58	0.45-0.75
Handicap		-0.36	0.10	<0.001	0.70	0.57-0.85
SATIS						
Overall mean	12.5	-1.48	0.23	<0.001	0.23	0.14-0.36
Functional complaints of the maxillary denture		-0.71	0.13	<0.001	0.49	0.38-0.64
Functional complaints of the mandibular denture		-0.47	0.09	<0.001	0.62	0.52-0.74
Vague denture complaints		-1.45	0.32	<0.001	0.23	0.13-0.44
Aesthetic complaints “too hollow”		-0.38	0.34	0.260	0.68	0.32-1.33
Aesthetic complaints “too bulbous”		-1.19	0.45	0.008	0.30	0.12-0.74

Table 2. Causal association between not chewing food and potential risk factors

Variables	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
SATIS	0.23 (0.14-0.36)	<0.001	0.32 (0.20-0.52)	<0.001
Patients satisfied with dentist on his/her fitting denture in initial stage				
No	3.83 (2.56-5.73)	<0.001	2.73 (1.78-4.21)	<0.001
Yes	1	-	1	-
Number of dentures	2.17 (1.66-2.84)	<0.001	1.94 (1.08-2.58)	<0.001
Number of persons living at home				
≥7	1.66 (1.09-2.54)	0.02	1.67 (1.08-2.58)	0.021
5-6	1	-	1	-
≤4	1.14 (0.87-1.50)	0.33	1.10 (0.83-1.46)	0.510

Anniversary, the proportion of chewing food was 87.5%. It is quite different from the ordinary work in which Nontaluck[10] found 62% for the proportion of patients wearing dentures in the 30-baht health care program. The reasons that may explain this difference could be related to the impact of royal support. Royal projects for Thai people have been extremely uncommon. It is well known that royal projects are considerably different from other ordinary projects since they are more effective, of higher quality, and more prestigious. This finding is confirmed by the work of Dalodom et al[4] that the use of dentures in Thai elderly was 93% in the DPSC project to also celebrate the King's 80th Birthday Anniversary. Additionally, both budgets of the "Khao Aroi" and the DPSC projects were extra, since they were not included in the ordinary budget and the government had to pay more for them. Important factors that influence chewing food are satisfaction with dentures (SATIS), patient satisfaction with dentist on his/her denture fitting work, and the amount of dentures in a patient after controlling the number of persons living at home, respectively. The SATIS score is the most important factor related to the use of royal dentures; the odds ratio of not chewing food decreased 0.32 times (or the odds ratio of chewing food increased 3.13 times) for a 1-score increase in SATIS after holding other predictors constant. This means in patient's receiving a preferable denture, the more inclined are the patients to use it. This result is consistent with Marcus et al[21] and Bolender et al[18] since the SATIS consisted of 40 complaint questions that were classified into 5 components as functional complaints of the maxillary denture (12 items), functional complaints of the mandibular denture (8 items), vague denture complaints (11 items), aesthetic complaints "too hollow" (5 items), and aesthetic complaints "too bulbous" (4 items). Even though the patients have a high score of satisfaction overall, some aspects should be considered, especially, in terms of the ability and the problem of functional chewing, irritation from food retention, and cosmetic appeal.

Patient satisfaction with their dentist on his/her denture fitting work is a part of good oral health care and communication. Both oral health care and communication can increase an acceptance of the use of dentures. Chewing food in patients who were satisfied with their dentist on his/her denture fitting in the initial stage was 2.73 times more than those of patients who were not satisfied with their dentist when other covariates were controlled or adjusted. Consequently, it is necessary to give information about the dentures, the denture fitting, problems concerning denture fittings that might be solved, how to use dentures for chewing, problems that may occur after long use, how to maintain dentures and take care of the mouth. All are the main points for better oral health care and communication.

The number of dentures has a significantly positive association with not chewing food. The odds ratio of not chewing food for patients with several dentures was 1.94 times ($p<0.001$) higher than those of patients with a single denture while controlling other covariates. This work found further that the average amount (quantity) of complete dentures per patient was 1.1 (SD = 0.3) units including this free, royal, complete denture; there were only 9.9% of elderly that had two units or more of dentures so the financial difficulties of the elderly people in this paper seem larger. In a comparison to the work of Nontaluck[10], the average number of dentures was close to 2.0; 66.28% of the

patients had two units of dentures or more. Note the Nontaluck study area included Bangkok and its perimeters in which people seem likely richer, whereas, our study was employed on a large national area over the whole country. In addition, Watanaruangrong[22] found that the accessibility of services of elderly having sufficient income to support their living was 2.6 times greater than those with insufficient income.

Several potential variables shown in Table 1 are considered significant in the screening phase, but non-significant in the multivariate phase, and should be further investigated with the use of dentures. In our opinion, the first five variables such as education, religion, lipoprotein disease, thyroid disease, and age at first using dentures could possibly play a role in confounding variables while the rest of the variables such as problems with denture fitting, regular meetings with dentist, and OHIP might be possible as potential risk factors if they can access significant relationships.

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Potential conflicts of interest

None.

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การไม่เคี้ยวอาหารด้วยฟันเทียมถอดได้ทั้งปากของชาวไทยผู้สูงอายุ

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วัตถุประสงค์: การศึกษานี้ต้องการค้นหาการใช้งานฟันเทียมถอดได้ทั้งปากด้วยการไม่เคี้ยวอาหารและประเมินความสัมพันธ์ระหว่างการไม่เคี้ยวอาหารกับปัจจัยเสี่ยงต่างๆ ของผู้สูงอายุชาวไทย

วัสดุและวิธีการ: ภายใต้การสนับสนุนจากโครงการ "ข้าวอร่อย" หรือ "รากฟันเทียม" ของสถาบันทันตกรรม กรมการแพทย์ กระทรวงสาธารณสุขร่วมกับกระทรวงวิทยาศาสตร์และเทคโนโลยี ในปี พ.ศ. 2550-2554 การศึกษาภาคตัดขวางเชิงสำรวจด้วยวิธีสุ่มแบบหลายขั้นตอน ในปี พ.ศ. 2551 ได้ดำเนินขึ้นใน 21 จังหวัด 87 โรงพยาบาล กับตัวอย่างสุ่มชาวไทยสูงอายุจำนวน 2,676 ราย กลุ่มตัวอย่างถูกสุ่มเลือกจากกรอบตัวอย่าง ชาวไทยสูงอายุจำนวน 58,043 ราย ภายใต้โครงการฟันเทียมพระราชทานในปี พ.ศ. 2548-2550 โดยตัวอย่าง ทุกรายเคยได้รับฟันเทียมพระราชทานถอดได้ทั้งปากฟรี เป็นเวลาอย่างน้อย 3 เดือน การสัมภาษณ์ข้อมูลได้ดำเนินงาน ระหว่างเดือนพฤษภาคมถึงเดือนตุลาคม ปี พ.ศ. 2551 ด้วยแบบสอบถาม การวิเคราะห์ข้อมูลได้แก่ การพรรณาข้อมูลและการวิเคราะห์การถดถอยสำหรับตัวแปรตามสองค่าแบบโลจิสติก

ผลการศึกษา: การใช้งานฟันเทียมพระราชทานถอดได้ทั้งปากด้วยการไม่เคี้ยวอาหาร พบร้อยละ 12.5 ซึ่งแสดงความมีประสิทธิภาพสูงกว่าโครงงานอื่นทั่วไป เช่น นนทลักษณ์ พบว่าการไม่ใส่ฟันเทียมในโครงการ 30 บาท รักษาทุกโรคพบร้อยละ 38 และดาโลดมพบว่าการไม่ใช้งานฟันเทียมภายใต้โครงการฟันเทียมพระราชทานพบร้อยละ 7 ปัจจัยสำคัญที่อธิบายการใช้ฟันเทียมด้วยการไม่เคี้ยวอาหาร ได้แก่ ความพึงพอใจต่อฟันเทียม ความพึงพอใจ ต่อทันตแพทย์ในการใส่ฟันเทียม เมื่อควบคุมจำนวนชุดฟันเทียมที่มีของผู้ป่วยตามลำดับ

สรุป: ความพึงพอใจต่อฟันเทียม ความพึงพอใจต่อทันตแพทย์ในการใส่ฟันเทียม และการสื่อสารที่ดีระหว่างทันตแพทย์กับผู้ป่วย ถือเป็นหัวใจของความสำเร็จที่มีต่อการใช้งานฟันเทียมพระราชทาน