

รายงานวิจัยฉบับสมบูรณ์

เรื่อง

การศึกษาปัจจัยที่มีผลต่อการตัดสินใจเลือกผ่าตัดไทรอยด์ระหว่างแบบเปิด  
แผลที่คอและแบบส่องกล้องผ่านบริเวณลานนมและรักแร้

Title

Factors of decision making on types of thyroid surgery in favor  
of the endoscopic approach

สำนักหอสมุด มหาวิทยาลัยนครสวรรค์

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โดย

คณะผู้วิจัย

1. นายแพทย์อัฐพล จุลพันธ์
2. แพทย์หญิงชนิตา จันทร์ทิม
3. แพทย์หญิงชฎาธาร เหลืองสว่าง

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ปีงบประมาณ 2560

## กิตติกรรมประกาศ

โครงการวิจัยนี้ ได้รับทุนอุดหนุนการวิจัยจากงบประมาณรายได้ กองทุนวิจัยมหาวิทยาลัย  
นเรศวร ประจำปีงบประมาณ พ.ศ. 2560



## บทคัดย่อมหาวิทยาลัยนเรศวร

### ส่วนที่ 1 รายละเอียดเกี่ยวกับโครงการวิจัย

ชื่อโครงการ การศึกษาปัจจัยที่มีผลต่อการตัดสินใจเลือกผ่าตัดไทรอยด์ระหว่างแบบเปิดแผลที่คอและแบบส่องกล้องผ่านบริเวณลานนมและรักแร้ (Factors of decision making on types of thyroid surgery in favor of the endoscopic approach)

#### หัวหน้าโครงการวิจัย

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2. แพทย์หญิงชฎาธาร เหลืองสว่าง (สัดส่วนที่รับผิดชอบ 20%)

สังกัด ภาควิชาโสต ศอ นาสิกวิทยา คณะแพทยศาสตร์

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ได้รับทุนอุดหนุนการวิจัยสาขาแพทยศาสตร์

งบประมาณพ.ศ.2560 จำนวนเงิน 121,000 บาท

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### ส่วนที่ 2 บทคัดย่อ

**จุดประสงค์:** เพื่อศึกษาถึงปัจจัยที่มีผลต่อการตัดสินใจเลือกผ่าตัดไทรอยด์ของผู้ป่วยระหว่างแบบเปิดแผลที่คอและแบบส่องกล้องผ่านบริเวณลานนมและรักแร้

**วิธีการศึกษา:** การศึกษานี้ได้รวบรวมข้อมูลทั่วไปของผู้ป่วยรวมถึงคะแนนความวิตกกังวลต่อปัจจัยต่างๆที่เกี่ยวข้องของการผ่าตัด ในผู้ป่วยที่ได้รับการผ่าตัดต่อมไทรอยด์แบบเปิดแผลที่คอและแบบส่องกล้องผ่านบริเวณลานนมและรักแร้

**ผลการศึกษา:** จากผู้ป่วยทั้งหมด 52 คน ซึ่งผู้ป่วย 21 คนเลือกผ่าตัดไทรอยด์แบบเปิดแผลที่คอและผู้ป่วย 31 คนเลือกผ่าตัดไทรอยด์แบบส่องกล้องผ่านบริเวณลานนมและรักแร้ พบว่าปัจจัยที่มีผลต่อการตัดสินใจเลือกผ่าตัดไทรอยด์แบบส่องกล้องผ่านบริเวณลานนมและรักแร้ ได้แก่ ผู้ป่วยที่มีก้อนไทรอยด์ขนาดเล็กกว่า 3 เซนติเมตร ผู้ป่วยกังวลต่อการเกิดแผลที่คอจากผ่าตัดไทรอยด์แบบเปิดแผลที่

คอ และผู้ป่วยกังวลต่อความชำนาญของแพทย์ผ่าตัดต่อการผ่าตัดไทรอยด์แบบเปิดแผลที่คอ โดยมีค่า adjusted odds 10.46 2.1 และ 1.96 ตามลำดับ

สรุป: การศึกษานี้ได้ศึกษาถึงปัจจัยที่มีผลต่อการตัดสินใจเลือกผ่าตัดไทรอยด์แบบส่องกล้องผ่านบริเวณลานนมและรักแร้ โดยพบว่าปัจจัยดังกล่าวได้แก่ ผู้ป่วยที่มีก้อนไทรอยด์ขนาดเล็ก ผู้ป่วยกังวลต่อการเกิดแผลที่คอ และผู้ป่วยกังวลต่อความชำนาญของแพทย์ผ่าตัดต่อการผ่าตัดไทรอยด์แบบเปิดแผลที่คอ



## Abstract

**Objective:**

This study investigates and identifies factors that predict patient interest in endoscopic thyroidectomy.

**Methods:**

This study was conducted on patients who underwent open or endoscopic thyroidectomy. Their demographic data were recorded, and the preoperative anxiety score based on a visual analogue scale (0-10) were evaluated.

**Results:**

Of the 52 patients reviewed, 21 underwent open thyroidectomy and 31 underwent endoscopic thyroidectomy. The significant factors predicting a patient's decision in favor of endoscopic thyroidectomy were: small thyroid nodule of  $\leq 3$  cm, great concern about neck scarring, and great concern about the open technique's surgeon experience with adjusted odds of 10.46, 2.1 and 1.96, respectively.

**Conclusions:**

To date, this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy. The predictors were small thyroid nodule and great concern about neck scarring or open technique's surgeon experience.

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## คำอธิบายสัญลักษณ์และคำย่อที่ใช้ในการวิจัย

ตัวย่อ	คำเต็ม
PAS	preoperative anxiety score
FNA	fine-needle aspiration
BMI	body mass index
SD	standard deviations
OR	odds ratio
CI	confidence interval
open	open thyroidectomy
endo	endoscopic thyroidectomy



## บทนำ

### ที่มาและความสำคัญของปัญหา

Conventional open thyroid surgery is considered a standard surgical procedure that is safe and has a low rate of complications. However, open thyroid surgery results in a scar on the neck that is clearly noticeable. A newer technique for performing thyroid surgery is by means of laparoscopy, which has the advantage of avoiding scarring on the neck. The first such endoscopic surgery was carried out by Gagner who performed parathyroidectomy.<sup>1</sup> Since then, numerous techniques for endoscopic thyroidectomy have been developed, and these can be categorized into cervical approaches and non-cervical approaches, the latter requiring greater dissection.<sup>2-6</sup> Non-cervical approaches usually access the thyroid gland via the axilla,<sup>7-15</sup> the areola,<sup>16-18</sup> or the oral vestibule.<sup>19-22</sup> Endoscopic thyroidectomy via axillo-breast,<sup>23-32</sup> either with or without gas insufflation, has been the non-cervical access route most commonly described in recent literature and is also the technique routinely performed at Naresuan University Hospital. Any surgical approach in which incision is made in an area other than the neck carries the advantage of leaving no scar on the neck after surgery, which is preferred by most patients.<sup>17,33</sup> A previous study showed that endoscopic and open thyroid surgery were similar in complication rates,<sup>33</sup> however the endoscopic approach was significantly more expensive than the open approach.

### วัตถุประสงค์ของการวิจัย

This study investigates and identifies factors that predict patient interest in endoscopic thyroid surgery.

### ขอบเขตการวิจัย

This study was conducted on patients who underwent thyroidectomy by one of two approaches: conventional open thyroidectomy or endoscopic thyroidectomy via axillo-breast.

### ประโยชน์ที่คาดว่าจะได้รับ

A thorough search of previous research indicates that to date this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy.



## เนื้อเรื่อง

### วิธีดำเนินการวิจัย

#### วิธีดำเนินงานวิจัย (Material and methods)

##### ประชากรและตัวอย่าง

This cross-sectional study was conducted on patients who underwent thyroidectomy by one of two approaches: conventional open thyroidectomy or endoscopic thyroidectomy via axillo-breast.

##### การคัดเลือกผู้เลือกผู้เข้าร่วมการศึกษา (subject )

##### เกณฑ์คัดเข้าอาสาสมัคร (Inclusion criteria )

The study covers patients age 18 and older who chose their preferred thyroidectomy method during the period October 2016 to September 2018.

##### เกณฑ์การคัดแยกอาสาสมัคร (Exclusion criteria )

Patients with substernal thyroid mass, thyroid nodule size larger than 7 cm, or thyroid fine-needle aspiration (FNA) result other than benign were excluded.

##### การรวบรวมข้อมูล และสถานที่เก็บข้อมูล

All the patients received their surgery at Naresuan University's Department of Otolaryngology-Head and Neck Surgery. Each patient completed a questionnaire on their concerns regarding each of the two possible options for their surgery, and every response was collected as a preoperative anxiety score (PAS) based on a visual analogue scale (0-10). The questionnaire collected PAS on getting a second opinion, surgical technique, surgeon experience and postoperative issues (including wound pain, bruise/ecchymosis, surgical scar/keloid, and skin paresthesia). Variables evaluated included the following: demographics (sex, age, body mass index - BMI, marital status, income, insurance coverage of medical expenses), chronic disease comorbidities, previous surgery, size of thyroid nodule, and PAS on both open and endoscopic approaches using a visual analogue scale (0-10). Questionnaire responses

were analyzed in order to evaluate the factors that affect patients' decision when choosing their preferred thyroid surgery method. Written informed consent was collected from all participants.

### การวิเคราะห์ข้อมูล

The continuous variables with normal distribution were presented as means  $\pm$  standard deviations (SD), while the non-normally distributed data were presented by median and range. The Kolmogorov-Smirnov Z test was used for evaluating the normal distribution. Categorical data were analyzed using the Chi-square test or Fisher's exact test. The independent t-test or Mann-Whitney U test was performed for comparing continuous data between both patients who opted for open surgery (the "open group") and patients who opted for endoscopic surgery (the "endo group"). Comparison of the PAS toward open approach versus endoscopic approach in each of the two groups was analyzed by paired t-test. Multiple logistic regression with the backward stepwise method was performed for evaluating the factors affecting the patients' decision on surgery approach. P-value less than 0.05 was considered statistically significant. All statistics were calculated using PASW Statistics for Windows, Version 18.0 (SPSS Inc, Chicago, IL, USA).

## ผลการวิจัย

A total of 52 patients (8 males and 44 females) with a mean age of 50 years were reviewed. There were 21 people who chose the open approach and 31 people who chose the endoscopic approach. All patient demographic data are shown in Table 1. Between the open and endo groups, there were only two demographic characteristics found to be significantly different ( $p < 0.05$ ): gender and size of thyroid nodule. The proportion of females was greater in the endo group than in the open group. The size of thyroid nodule was significantly greater in the open group than in the endo group. Most of the patients had partial insurance coverage for their medical expenses.

Tables 2 and 3 respectively show the open and endo group patients' subjective characterization of their preoperative anxiety towards both open and endoscopic approaches on a visual analogue scale. Table 2 shows that patients who decided on open thyroidectomy had more anxiety regarding surgeon experience when considering the endoscopic approach than when considering the open approach. This was the only one statistically significant ( $p < 0.05$ ) difference found in the open group. Table 3 shows that patients who chose endoscopic thyroidectomy had more anxiety regarding the open approach than the endoscopic approach across all aspects of surgery (including second opinion, surgical technique, surgeon experience, postoperative wound pain, bruise/ecchymosis, surgical scar/keloid, and skin paresthesia). Statistically significant differences ( $p < 0.05$ ) were found in all those aspects. The overall PAS regarding anesthesia and major post-operative complications are shown in Table 4 where the anxiety score regarding vocal cord paralysis was significantly different ( $p < 0.05$ ) between the open group and the endo group. Major post-operative complications were defined as complications that caused prolonged hospitalization, required reoperation, or necessitated higher acuity of care. A bar chart comparing the average PAS of the open group and those of the endo group is shown in Figure 1.

In order to predict the odds of the factors affecting the patients' decision on surgery approach, logistic regression analysis was performed, and the results are shown in Table 5. Based on multivariable analysis after controlling for other factors,

the three significant factors affecting patients' decision on surgery approach were found to be: the size of thyroid nodule, anxiety scores on surgical scar/keloid, and anxiety scores on surgeon experience. Specifically, patients with a thyroid nodule 3 cm or smaller were more likely to choose endoscopic thyroidectomy, with adjusted odds of 10.46. In addition, high anxiety scores on the open approach's surgical scarring/keloid and the open approach's surgeon experience were significant factors leading patients to choose the endoscopic approach, with adjusted odds of 2.10 and 1.96, respectively.



ตารางที่ 1. Patient demographic data.

Demographic data		Open (n = 21)	Endo (n = 31)	P-values
Sex	Male (%)	6 (75.0)	2 (25.0)	0.049*
	Female (%)	15 (34.1)	29 (65.9)	
Age (years)	Mean±SD	50.0±10.0	50.0±12.4	1.000
	Range	26 - 65	27 - 72	
BMI (kg/m <sup>2</sup> )	Mean±SD	23.6±4.0	23.3±3.7	0.809
	Range	19.2-32.1	16.6-32.5	
Marital status	Single (%)	3 (33.3)	6 (66.7)	0.865
	Married (%)	17 (41.5)	24 (58.5)	
	Divorced/ Widowed (%)	1 (50.0)	1 (50.0)	
Chronic disease <sup>a</sup>	Present (%)	10 (40.0)	15 (60.0)	0.957
	Absent (%)	11 (40.7)	16 (59.3)	
Previous surgery (%)	Present (%)	13 (41.9)	18 (58.1)	0.782
	Absent (%)	8 (38.1)	13 (61.9)	
Income (THB)	Median	20,000	19,000	0.786
	Range	2,000-50,000	0-50,000	
Medical expenses	Full self-payment (%)	0 (0.0)	3 (100.0)	0.264
	Partial insurance coverage (%)	21 (42.9)	28 (57.1)	
Thyroid nodule size (cm) <sup>b</sup>	Mean±SD	4.0±1.8	2.8±1.4	0.019*
	Range	1.3-7.0	1.0-6.0	

The quantitative data are presented as mean ± standard deviation (S.D.), while the qualitative data are presented as numbers (%).

*Open* Open thyroidectomy chosen, *Endo* Endoscopic thyroidectomy chosen, BMI Body mass index.

\* Statistically significant differences were found between Open and Endo.

<sup>a</sup> Defined by the U.S. National Center for Health Statistics.

<sup>b</sup> Measured the largest thyroid nodule by ultrasonography.



ตารางที่ 2. Preoperative anxiety scores<sup>a</sup> regarding both approaches in patients who decided on open thyroidectomy (n=21).

Anxiety scores	Open	Endo	Mean difference	
			Open - Endo (95%CI)	P-values
Second opinion	2.0±2.0	3.2±2.7	-1.2 (-2.6, 0.1)	0.073
Surgical technique	3.2±2.5	4.1±3.3	-0.9 (-2.6, 0.8)	0.293
Surgeon experience	2.2±2.4	3.5±2.7	-1.4 (-2.4, -0.3)	0.012*
Wound pain	5.1±2.2	5.3±2.7	-0.3 (-1.4, 0.9)	0.611
Bruise/ecchymosis	4.1±2.2	4.1±2.5	-0.05 (-0.9, 0.8)	0.908
Surgical scar/keloid	4.5±3.3	3.9±3.1	0.6 (-0.6, 1.7)	0.324
Skin paresthesia	5.4±2.3	4.8±2.6	0.6 (-0.3, 1.6)	0.182
Overall	4.1±2.3	5.1±2.9	-1.0 (-1.8, -0.05)	0.040*

The quantitative data are presented as mean ± standard deviation (S.D.).

*Open* Open thyroidectomy, *Endo* Endoscopic thyroidectomy.

<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.

ตารางที่ 3. Preoperative anxiety scores<sup>a</sup> regarding both approaches in patients who decided on endoscopic thyroidectomy (n=31).

Anxiety scores	Open	Endo	Mean difference	
			Open - Endo (95%CI)	P-values
Second opinion	4.3±3.0	2.3±2.2	2.0 (0.8, 3.2)	0.002*
Surgical technique	6.0±2.2	4.8±2.8	1.2 (0.1, 2.4)	0.038*
Surgeon experience	3.2±2.2	2.4±2.2	0.9 (1.7, 2.1)	0.048*
Wound pain	6.9±2.2	4.8±2.2	2.1 (1.3, 2.9)	<0.001*
Bruise/ecchymosis	6.1±2.4	3.8±2.4	2.2 (1.3, 3.2)	<0.001*
Surgical scar/keloid	7.3±2.5	3.1±2.0	4.2 (3.2, 5.2)	<0.001*
Paresthesia	6.5±2.4	3.9±2.3	2.6 (1.7, 3.5)	<0.001*
Overall	6.3±2.8	3.9±2.6	2.5 (1.3, 3.7)	<0.001*

The quantitative data are presented as mean ± standard deviation (S.D.).

*Open* Open thyroidectomy, *Endo* Endoscopic thyroidectomy.

<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.

ตารางที่ 4. Overall preoperative anxiety scores<sup>a</sup> regarding anesthesia and major post-operative complications.

Anxiety scores	Open (n = 21)	Endo (n = 31)	Mean difference	
			Open - Endo (95%CI)	P-values
Anesthesia	5.2 ± 2.6	6.4 ± 2.5	-1.2 (-2.6, 0.3)	0.104
Wound infection	5.2 ± 3.0	6.4 ± 2.3	-1.2 (-2.6, 0.4)	0.138
Hematoma	4.8 ± 2.8	6.4 ± 3.1	-1.6 (-3.3, 0.04)	0.056
Vocal cord paralysis	5.7 ± 2.8	7.3 ± 2.3	-1.6 (-3.1, -0.2)	0.027*

The quantitative data are presented as mean ± standard deviation (S.D.)

*Open* Open thyroidectomy chosen, *Endo* Endoscopic thyroidectomy chosen.

<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.

ตารางที่ 5. Logistic regression analysis for evaluating the factors affecting the patients' decision on surgery approach.

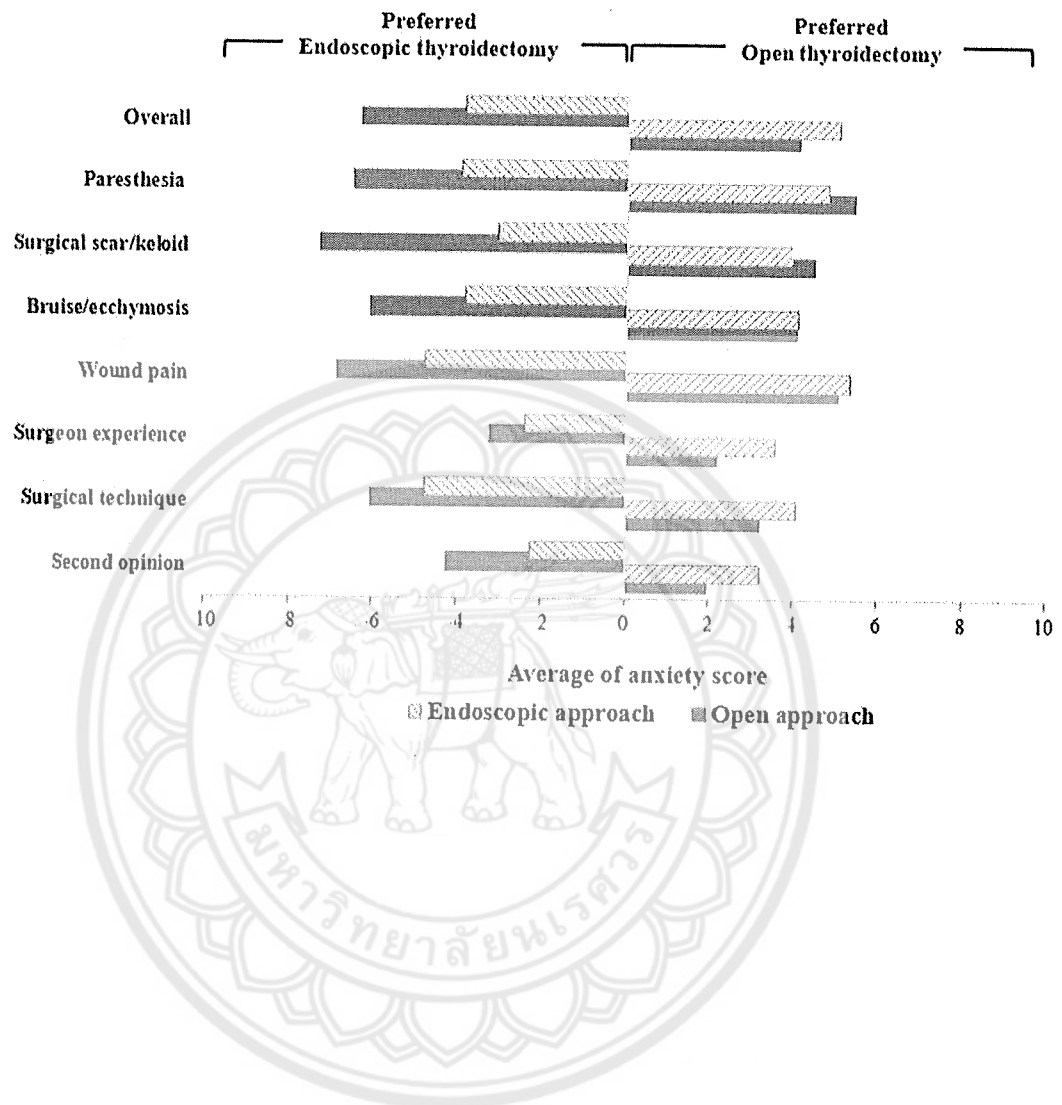
Groups	Univariate		Multivariate		
	Crude OR )95 %CI(	P-values*	Adjusted OR )95 %CI(	P-values**	
Sex	Female	5.80 (1.04, 32.31)	0.045	11.53 (0.70, 189.04)	0.087
	Male				
Age )years(		1.00 (0.95, 1.05)	1.000		
BMI )kg/m <sup>2</sup> (		0.98 (0.85, 1.14)	0.804		
Marital status	Single	1.44 (0.32, 6.54)	0.637		
	Non-single				
Chronic disease		1.03 (0.34, 3.13)	0.957		
Previous surgery	Yes	0.85 (0.27, 2.65)	0.782		
Thyroid nodule- size (cm)	≤ 3	4.73 (1.31, 17.08)	0.018	10.46 (1.23, 89.08)	0.032
	> 3				
<i>Preoperative anxiety scores difference between open and endo.</i>					
Second opinion		1.56 (1.12, 2.01)	0.007		
Surgical technique		1.21 (1.01, 1.44)	0.039		
Surgeon experience		1.63 (1.13, 2.36)	0.009	1.96 (1.02, 3.77)	0.042
Wound pain		1.59 (1.16, 2.20)	0.004		
Bruise/ecchymosis		1.57 (1.15, 2.15)	0.005		
Surgical scar/keloid		1.75 (1.27, 2.42)	0.001	2.10 (1.24, 3.56)	0.006
Paresthesia		1.47 (1.10, 1.97)	0.010		
<i>Overall preoperative anxiety scores to anesthesia and major post-operative complication.</i>					
Anesthesia		1.20 (0.96, 1.51)	0.108		
Wound infection		1.18 (0.95, 1.47)	0.139		
Hematoma		1.21 (0.99, 1.46)	0.061		
Vocal cord paralysis		1.29 (1.02, 1.63)	0.033		

OR Odds ratio, CI Confidence interval, BMI Body mass index, Open Open thyroidectomy, Endo Endoscopic thyroidectomy.

\*P-values representing the significance of adjusted odds ratio from univariate analysis.

\*\*P-values representing the significance of adjusted odds ratio from multivariate analysis.

รูปที่ 1. Bar chart comparing the average of preoperative anxiety scores between the endoscopic and the open approach.



## ข้อวิจารณ์

Endoscopic treatment of thyroid nodules has become the more popular approach for surgical treatment because of its safety and excellent cosmetic result compared to conventional open thyroidectomy.<sup>33-35</sup> Numerous endoscopic techniques have been developed and the axillo-breast approach is currently the commonly performed approach in many institutes.

In this study, female patients had a higher incidence of thyroid nodule than male patients, as also indicated in previous literature.<sup>36</sup> In contrast to men, the female patients usually opted for endoscopic thyroidectomy rather than open approach. Patients with small thyroid nodule were more likely to choose the endoscopic approach.

In the open group, PAS on surgeon experience was higher toward in endoscopic approach than toward the open approach. This might be explained by patients' unfamiliarity with endoscopic thyroidectomy, which is a newer surgical procedure.

In the endo group, all PAS toward the open approach were higher than toward the endoscopic approach. This could be due to the negative impact of the patient's second opinion result or due to negative impressions the patient might hold of other operations that use the open approach. The larger incision of the open approach could explain the higher anxiety scores on wound pain, bruising or ecchymosis, paresthesia, and scarring or keloid.

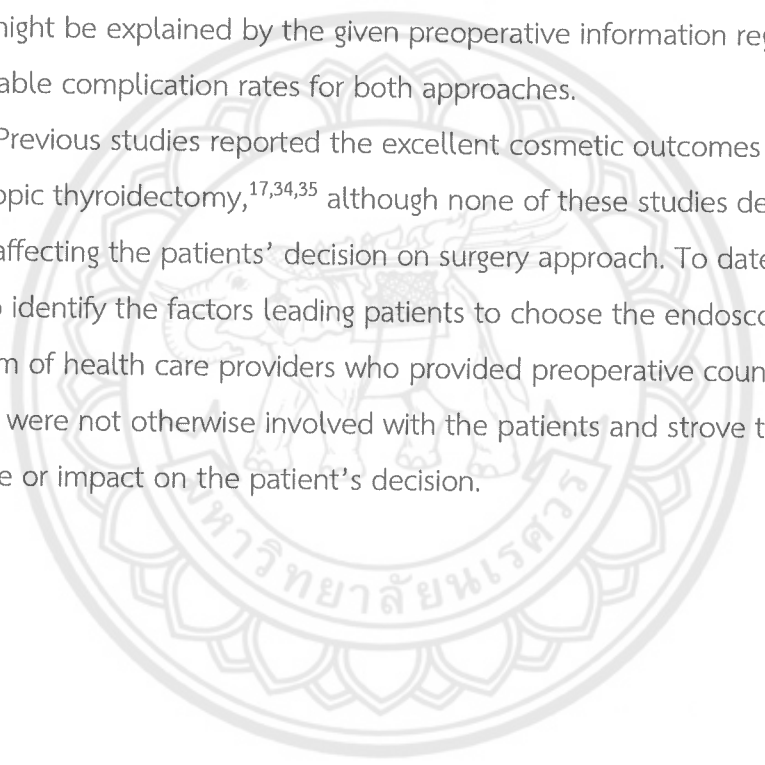
A previous study reported no statistically significant differences in the incidence of recurrent laryngeal nerve paralysis between endoscopic and open thyroidectomy.<sup>37</sup> However, the current study demonstrated that recurrent laryngeal nerve paralysis was a greater concern for patients in the endo group than for patients in the open group, despite the patients being carefully informed beforehand that the chances of recurrent laryngeal nerve paralysis are comparable for both approaches.

Logistic regression analysis shows that patients with high anxiety scores on the open approach's surgical scarring/keloid was significant factor, regarding cosmetic and aesthetic aspects, leading patients to choose the endoscopic approach. Patients with a thyroid nodule 3 cm or smaller and patients with high anxiety scores on the open

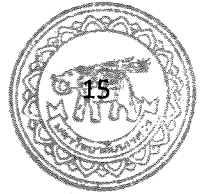
approach's surgeon experience were the predictors, regarding disease and surgical procedure, leading patients to choose the endoscopic approach.

The amount of medical expenses did not affect the patients' decision on surgery approach, which is different from the previous report that revealed the less popularity of the endoscopic approach because of the higher cost compared to the open approach.<sup>38</sup> The impact of the patient's second opinion result might influence the patients' decision on surgery approach; however, we could not find the correlation in this study. The anesthesia and major post-operative complications did not affect patients' decision when choosing their preferred thyroid surgery method, which might be explained by the given preoperative information regarding comparable complication rates for both approaches.

Previous studies reported the excellent cosmetic outcomes following endoscopic thyroidectomy,<sup>17,34,35</sup> although none of these studies described the factors affecting the patients' decision on surgery approach. To date, this is the first study to identify the factors leading patients to choose the endoscopic approach. The team of health care providers who provided preoperative counseling to the patients were not otherwise involved with the patients and strove to have no influence or impact on the patient's decision.



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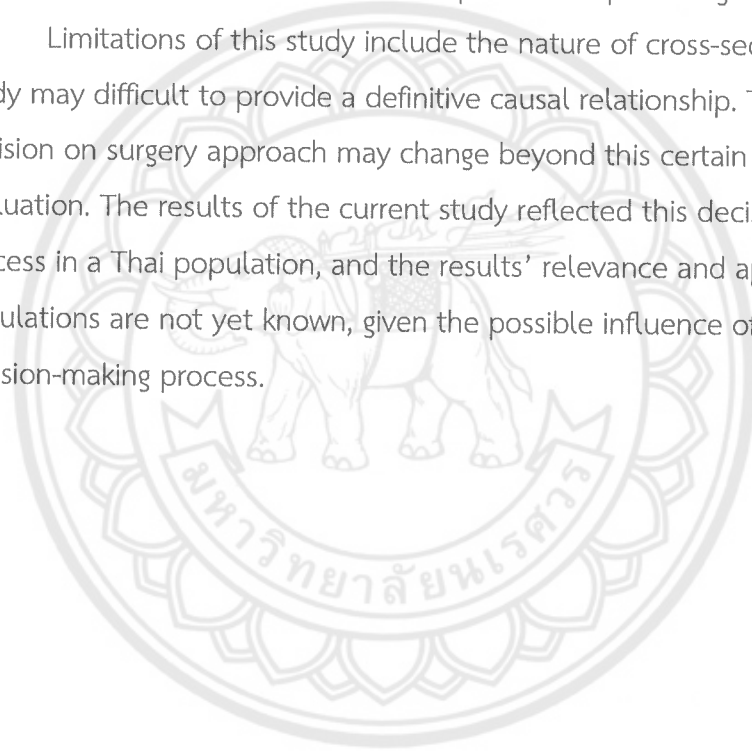
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## สรุปและข้อเสนอแนะ

Endoscopic treatment of thyroid nodules has become the more popular approach for surgical treatment because of its safety and excellent cosmetic result compared to conventional open thyroidectomy. A thorough search of previous research indicates that to date this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy. The predictors were: small thyroid nodule of  $\leq 3$  cm, great concern about neck scarring, and great concern about the open technique's surgeon experience.

Limitations of this study include the nature of cross-sectional analysis, the study may difficult to provide a definitive causal relationship. The patients' decision on surgery approach may change beyond this certain point of evaluation. The results of the current study reflected this decision-making process in a Thai population, and the results' relevance and applicability to other populations are not yet known, given the possible influence of culture on the decision-making process.





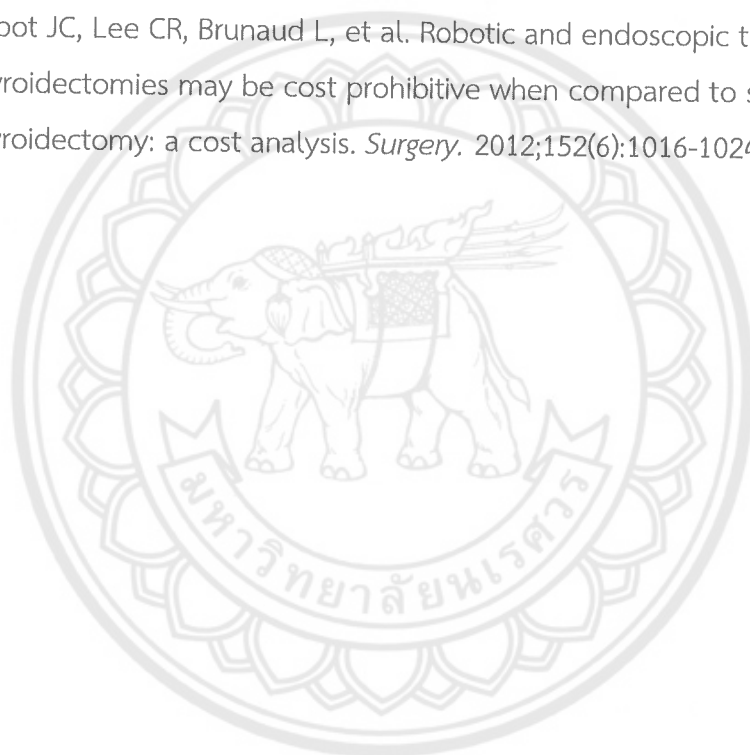
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## Output ที่ได้จากโครงการ

## ตัวชี้วัดเพื่อการประเมินผลสำเร็จของโครงการ

ระดับผลงาน	ประเภทของผลงาน	จำนวน
การตีพิมพ์ และเผยแพร่	1. ตีพิมพ์ในวารสารระดับนานาชาติที่มีค่า Impact Factor	0 เรื่อง
	2. ตีพิมพ์ในวารสารระดับนานาชาติ (ไม่มีค่า Impact Factor)	1 เรื่อง
	3. ตีพิมพ์ในวารสารระดับประเทศ	0 เรื่อง
	4. นำเสนอในการประชุมวิชาการในระดับนานาชาติ ที่มีการตีพิมพ์บทความบน Proceedings	0 เรื่อง
	5. นำเสนอในการประชุมวิชาการในระดับชาติ ที่มีการตีพิมพ์บทความบน Proceedings	0 เรื่อง
	6. ตีพิมพ์ในบทความวิชาการ ตำรา หนังสือที่มีการรับรองคุณภาพ	0 เรื่อง
การใช้ ประโยชน์	7. ถ่ายทอดผลงานวิจัย / เทคโนโลยีสู่กลุ่มเป้าหมาย และได้รับการรับรองการใช้ประโยชน์จากหน่วยงานที่เกี่ยวข้อง	0 เรื่อง
	8. ได้สิ่งประดิษฐ์ อุปกรณ์ เครื่องมือ หรืออื่นๆ เช่น ฐานข้อมูล Software ที่สามารถนำไปใช้ประโยชน์ได้ต่อไป	0 ผลงาน
การจดทะเบียน ทรัพย์สินทาง ปัญญา	9. อนุสิทธิบัตร	0 ผลงาน
	10. สิทธิบัตร	0 ผลงาน



ภาคผนวก

มหาวิทยาลัยนเรศวร

# Annals of Otolaryngology, Rhinology & Laryngology

## Factors of decision making on types of thyroid surgery in favor of the endoscopic approach

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Complete List of Authors:	Junlapan , Attapon ; Naresuan University Faculty of Medicine, Otolaryngology-Head and Neck Surgery Luangsawang, Chadarthan; Naresuan University Faculty of Medicine, Otolaryngology-Head and Neck Surgery Chantim, Chanida; Naresuan University Faculty of Medicine, Otolaryngology-Head and Neck Surgery
Keywords:	endoscopy < Miscellaneous, thyroidectomy < Miscellaneous, decision making, esthetics, anxiety < Miscellaneous, logistic models
Abstract:	<p><b>Objective:</b> This study investigates and identifies factors that predict patient interest in endoscopic thyroidectomy.</p> <p><b>Methods:</b> This study was conducted on patients who underwent open or endoscopic thyroidectomy. Their demographic data were recorded, and the preoperative anxiety score based on a visual analogue scale (0-10) were evaluated.</p> <p><b>Results:</b> Of the 52 patients reviewed, 21 underwent open thyroidectomy and 31 underwent endoscopic thyroidectomy. The significant factors predicting a patient's decision in favor of endoscopic thyroidectomy were: small thyroid nodule of <math>\leq 3</math> cm, great concern about neck scarring, and great concern about the open technique's surgeon experience with adjusted odds of 10.46, 2.1 and 1.96, respectively.</p> <p><b>Conclusions:</b> To date, this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy. The predictors were small thyroid nodule and great concern about neck scarring or open technique's surgeon experience.</p>

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## Factors of decision making on types of thyroid surgery in favor of the endoscopic approach

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**Abstract****Objective:**

This study investigates and identifies factors that predict patient interest in endoscopic thyroidectomy.

**Methods:**

This study was conducted on patients who underwent open or endoscopic thyroidectomy. Their demographic data were recorded, and the preoperative anxiety score based on a visual analogue scale (0-10) were evaluated.

**Results:**

Of the 52 patients reviewed, 21 underwent open thyroidectomy and 31 underwent endoscopic thyroidectomy. The significant factors predicting a patient's decision in favor of endoscopic thyroidectomy were: small thyroid nodule of  $\leq 3$  cm, great concern about neck scarring, and great concern about the open technique's surgeon experience with adjusted odds of 10.46, 2.1 and 1.96, respectively.

**Conclusions:**

To date, this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy. The predictors were small thyroid nodule and great concern about neck scarring or open technique's surgeon experience.

**Keywords:**

Endoscopy, Thyroidectomy, Decision making, Esthetics, Anxiety, Logistic Models

## Introduction

Conventional open thyroid surgery is considered a standard surgical procedure that is safe and has a low rate of complications. However, open thyroid surgery results in a scar on the neck that is clearly noticeable. A newer technique for performing thyroid surgery is by means of laparoscopy, which has the advantage of avoiding scarring on the neck. The first such endoscopic surgery was carried out by Gagner who performed parathyroidectomy.<sup>1</sup> Since then, numerous techniques for endoscopic thyroidectomy have been developed, and these can be categorized into cervical approaches and non-cervical approaches, the latter requiring greater dissection.<sup>2-6</sup> Non-cervical approaches usually access the thyroid gland via the axilla,<sup>7-15</sup> the areola,<sup>16-18</sup> or the oral vestibule.<sup>19-22</sup> Endoscopic thyroidectomy via axillo-breast,<sup>23-32</sup> either with or without gas insufflation, has been the non-cervical access route most commonly described in recent literature and is also the technique routinely performed at Naresuan University Hospital. Any surgical approach in which incision is made in an area other than the neck carries the advantage of leaving no scar on the neck after surgery, which is preferred by most patients.<sup>17,33</sup> A previous study showed that endoscopic and open thyroid surgery were similar in complication rates,<sup>33</sup> however the endoscopic approach was significantly more expensive than the open approach. This study investigates and identifies factors that predict patient interest in endoscopic thyroid surgery.

## Materials and Methods

This study was conducted according to the Declaration of Helsinki for studies on human subjects, and it was approved by the Naresuan University Institutional Review Board (IRB#R2560C055). This cross-sectional study was conducted on patients who underwent

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4 thyroidectomy by one of two approaches: conventional open thyroidectomy or endoscopic  
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6 thyroidectomy via axillo-breast. The study covers patients age 18 and older who chose their  
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8 preferred thyroidectomy method during the period October 2016 to September 2018. All the  
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10 patients received their surgery at Naresuan University's Department of Otolaryngology-Head  
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12 and Neck Surgery. Each patient completed a questionnaire on their concerns regarding each of  
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14 the two possible options for their surgery, and every response was collected as a preoperative  
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16 anxiety score (PAS) based on a visual analogue scale (0-10). The questionnaire collected PAS on  
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18 getting a second opinion, surgical technique, surgeon experience and postoperative issues  
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20 (including wound pain, bruise/ecchymosis, surgical scar/keloid, and skin paresthesia). Patients  
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22 with substernal thyroid mass, thyroid nodule size larger than 7 cm, or thyroid fine-needle  
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24 aspiration (FNA) result other than benign were excluded. Variables evaluated included the  
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26 following: demographics (sex, age, body mass index - BMI, marital status, income, insurance  
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28 coverage of medical expenses), chronic disease comorbidities, previous surgery, size of thyroid  
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30 nodule, and PAS on both open and endoscopic approaches using a visual analogue scale (0-10).  
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32 Questionnaire responses were analyzed in order to evaluate the factors that affect patients'  
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34 decision when choosing their preferred thyroid surgery method. Written informed consent was  
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36 collected from all participants.  
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### 45 **Results and analysis**

46  
47 A total of 52 patients (8 males and 44 females) with a mean age of 50 years were  
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49 reviewed. There were 21 people who chose the open approach and 31 people who chose the  
50  
51 endoscopic approach. All patient demographic data are shown in Table 1. Between the open and  
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53 endo groups, there were only two demographic characteristics found to be significantly different  
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4 (p<0.05): gender and size of thyroid nodule. The proportion of females was greater in the endo  
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6 group than in the open group. The size of thyroid nodule was significantly greater in the open  
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8 group than in the endo group. Most of the patients had partial insurance coverage for their  
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10 medical expenses.  
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13 Tables 2 and 3 respectively show the open and endo group patients' subjective  
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15 characterization of their preoperative anxiety towards both open and endoscopic approaches on a  
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17 visual analogue scale. Table 2 shows that patients who decided on open thyroidectomy had more  
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19 anxiety regarding surgeon experience when considering the endoscopic approach than when  
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21 considering the open approach. This was the only one statistically significant (p<0.05) difference  
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23 found in the open group. Table 3 shows that patients who chose endoscopic thyroidectomy had  
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25 more anxiety regarding the open approach than the endoscopic approach across all aspects of  
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27 surgery (including second opinion, surgical technique, surgeon experience, postoperative wound  
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29 pain, bruise/ecchymosis, surgical scar/keloid, and skin paresthesia). Statistically significant  
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31 differences (p<0.05) were found in all those aspects. The overall PAS regarding anesthesia and  
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33 major post-operative complications are shown in Table 4 where the anxiety score regarding  
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35 vocal cord paralysis was significantly different (p<0.05) between the open group and the endo  
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37 group. Major post-operative complications were defined as complications that caused prolonged  
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39 hospitalization, required reoperation, or necessitated higher acuity of care. A bar chart comparing  
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41 the average PAS of the open group and those of the endo group is shown in Figure 1.  
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47 In order to predict the odds of the factors affecting the patients' decision on surgery  
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49 approach, logistic regression analysis was performed, and the results are shown in Table 5.  
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51 Based on multivariable analysis after controlling for other factors, the three significant factors  
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53 affecting patients' decision on surgery approach were found to be: the size of thyroid nodule,  
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3 anxiety scores on surgical scar/keloid, and anxiety scores on surgeon experience. Specifically,  
4 patients with a thyroid nodule 3 cm or smaller were more likely to choose endoscopic  
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6 thyroidectomy, with adjusted odds of 10.46. In addition, high anxiety scores on the open  
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8 approach's surgical scarring/keloid and the open approach's surgeon experience were significant  
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10 factors leading patients to choose the endoscopic approach, with adjusted odds of 2.10 and 1.96,  
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12 respectively.  
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### 17 *Statistical analysis*

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19 The continuous variables with normal distribution were presented as means  $\pm$  standard deviations  
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21 (SD), while the non-normally distributed data were presented by median and range. The  
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23 Kolmogorov-Smirnov Z test was used for evaluating the normal distribution. Categorical data  
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25 were analyzed using the Chi-square test or Fisher's exact test. The independent t-test or Mann-  
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27 Whitney U test was performed for comparing continuous data between both patients who opted  
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29 for open surgery (the "open group") and patients who opted for endoscopic surgery (the "endo  
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31 group"). Comparison of the PAS toward open approach versus endoscopic approach in each of  
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33 the two groups was analyzed by paired t-test. Multiple logistic regression with the backward  
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35 stepwise method was performed for evaluating the factors affecting the patients' decision on  
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37 surgery approach. P-value less than 0.05 was considered statistically significant. All statistics  
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39 were calculated using PASW Statistics for Windows, Version 18.0 (SPSS Inc, Chicago, IL,  
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41 USA).  
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### 50 **Discussion**

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52 Endoscopic treatment of thyroid nodules has become the more popular approach for  
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54 surgical treatment because of its safety and excellent cosmetic result compared to conventional  
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4 open thyroidectomy.<sup>33-35</sup> Numerous endoscopic techniques have been developed and the axillo-  
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6 breast approach is currently the commonly performed approach in many institutes.

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8 In this study, female patients had a higher incidence of thyroid nodule than male patients,  
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10 as also indicated in previous literature.<sup>36</sup> In contrast to men, the female patients usually opted for  
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12 endoscopic thyroidectomy rather than open approach. Patients with small thyroid nodule were  
13  
14 more likely to choose the endoscopic approach.

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16 In the open group, PAS on surgeon experience was higher toward in endoscopic approach  
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18 than toward the open approach. This might be explained by patients' unfamiliarity with  
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20 endoscopic thyroidectomy, which is a newer surgical procedure.

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22 In the endo group, all PAS toward the open approach were higher than toward the  
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24 endoscopic approach. This could be due to the negative impact of the patient's second opinion  
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26 result or due to negative impressions the patient might hold of other operations that use the open  
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28 approach. The larger incision of the open approach could explain the higher anxiety scores on  
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30 wound pain, bruising or ecchymosis, paresthesia, and scarring or keloid.

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32 A previous study reported no statistically significant differences in the incidence of  
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34 recurrent laryngeal nerve paralysis between endoscopic and open thyroidectomy.<sup>37</sup> However, the  
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36 current study demonstrated that recurrent laryngeal nerve paralysis was a greater concern for  
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38 patients in the endo group than for patients in the open group, despite the patients being carefully  
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40 informed beforehand that the chances of recurrent laryngeal nerve paralysis are comparable for  
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42 both approaches.

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44 Logistic regression analysis shows that patients with high anxiety scores on the open  
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46 approach's surgical scarring/keloid was significant factor, regarding cosmetic and aesthetic  
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48 aspects, leading patients to choose the endoscopic approach. Patients with a thyroid nodule 3 cm  
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3 or smaller and patients with high anxiety scores on the open approach's surgeon experience were  
4 the predictors, regarding disease and surgical procedure, leading patients to choose the  
5 endoscopic approach.  
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10 The amount of medical expenses did not affect the patients' decision on surgery  
11 approach, which is different from the previous report that revealed the less popularity of the  
12 endoscopic approach because of the higher cost compared to the open approach.<sup>38</sup> The impact of  
13 the patient's second opinion result might influence the patients' decision on surgery approach;  
14 however, we could not find the correlation in this study. The anesthesia and major post-operative  
15 complications did not affect patients' decision when choosing their preferred thyroid surgery  
16 method, which might be explained by the given preoperative information regarding comparable  
17 complication rates for both approaches.  
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29 Previous studies reported the excellent cosmetic outcomes following endoscopic  
30 thyroidectomy,<sup>17,34,35</sup> although none of these studies described the factors affecting the patients'  
31 decision on surgery approach. To date, this is the first study to identify the factors leading  
32 patients to choose the endoscopic approach. The team of health care providers who provided  
33 preoperative counseling to the patients were not otherwise involved with the patients and strove  
34 to have no influence or impact on the patient's decision.  
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43 Limitations of this study include the nature of cross-sectional analysis, the study may  
44 difficult to provide a definitive causal relationship. The patients' decision on surgery approach  
45 may change beyond this certain point of evaluation. The results of the current study reflected this  
46 decision-making process in a Thai population, and the results' relevance and applicability to  
47 other populations are not yet known, given the possible influence of culture on the decision-  
48 making process.  
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## Conclusions

Endoscopic treatment of thyroid nodules has become the more popular approach for surgical treatment because of its safety and excellent cosmetic result compared to conventional open thyroidectomy. A thorough search of previous research indicates that to date this is the first study to identify predictors that make a patient more likely to opt for endoscopic thyroidectomy. The predictors were: small thyroid nodule of  $\leq 3$  cm, great concern about neck scarring, and great concern about the open technique's surgeon experience.





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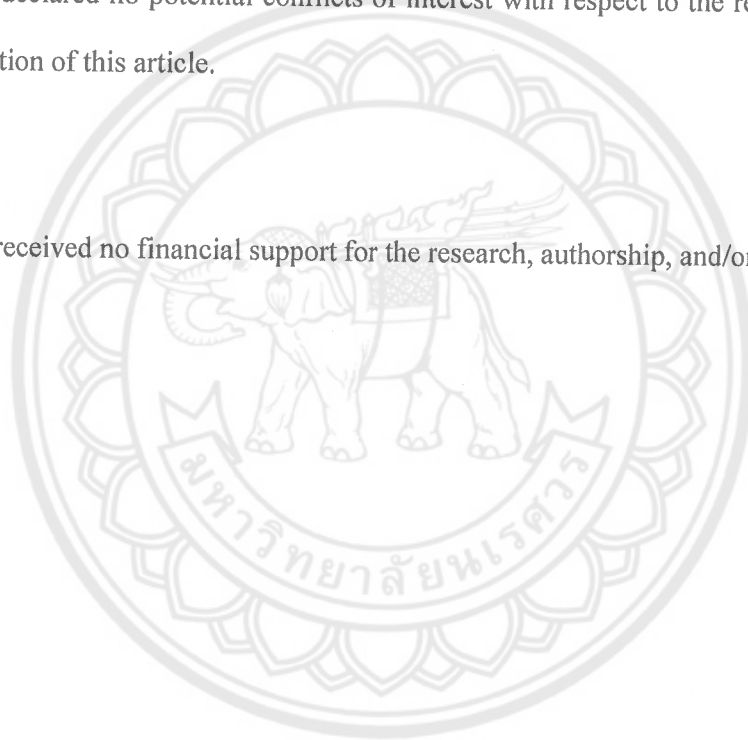
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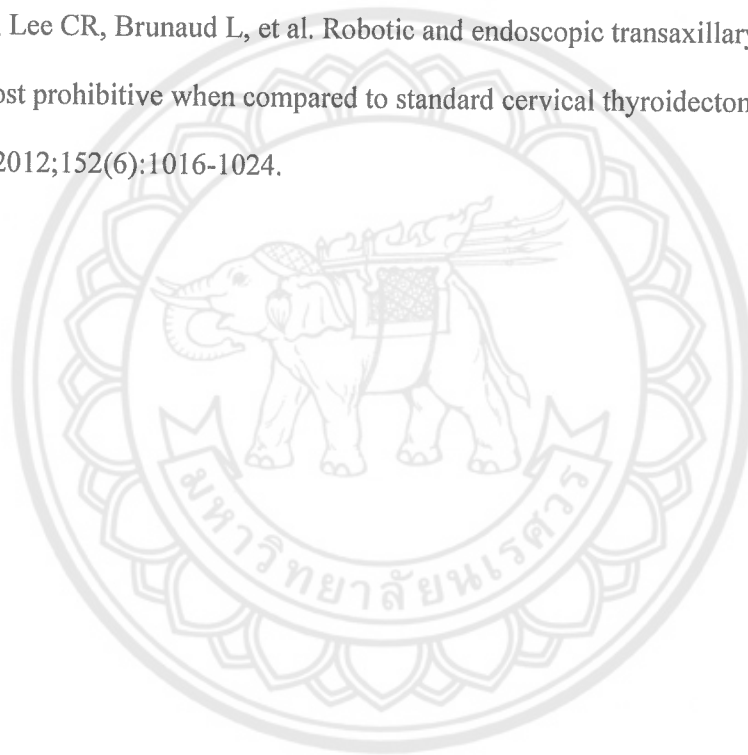


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**Table 1.** Patient demographic data.

Demographic data		Open (n = 21)	Endo (n = 31)	P-values
Sex	Male (%)	6 (75.0)	2 (25.0)	0.049*
	Female (%)	15 (34.1)	29 (65.9)	
Age (years)	Mean±SD	50.0±10.0	50.0±12.4	1.000
	Range	26 - 65	27 - 72	
BMI (kg/m <sup>2</sup> )	Mean±SD	23.6±4.0	23.3±3.7	0.809
	Range	19.2-32.1	16.6-32.5	
Marital status	Single (%)	3 (33.3)	6 (66.7)	0.865
	Married (%)	17 (41.5)	24 (58.5)	
	Divorced/ Widowed (%)	1 (50.0)	1 (50.0)	
Chronic disease <sup>a</sup>	Present (%)	10 (40.0)	15 (60.0)	0.957
	Absent (%)	11 (40.7)	16 (59.3)	
Previous surgery (%)	Present (%)	13 (41.9)	18 (58.1)	0.782
	Absent (%)	8 (38.1)	13 (61.9)	
Income (THB)	Median	20,000	19,000	0.786
	Range	2,000-50,000	0-50,000	
Medical expenses	Full self-payment (%)	0 (0.0)	3 (100.0)	0.264
	Partial insurance coverage (%)	21 (42.9)	28 (57.1)	
Thyroid nodule size (cm) <sup>b</sup>	Mean±SD	4.0±1.8	2.8±1.4	0.019*
	Range	1.3-7.0	1.0-6.0	

The quantitative data are presented as mean  $\pm$  standard deviation (S.D.), while the qualitative data are presented as numbers (%).

*Open* Open thyroidectomy chosen, *Endo* Endoscopic thyroidectomy chosen, BMI Body mass index.

\* Statistically significant differences were found between Open and Endo.

<sup>a</sup> Defined by the U.S. National Center for Health Statistics.

<sup>b</sup> Measured the largest thyroid nodule by ultrasonography.



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**Table 2.** Preoperative anxiety scores<sup>a</sup> regarding both approaches in patients who decided on open thyroidectomy (n=21).

Anxiety scores	Open	Endo	Mean difference	
			Open - Endo (95%CI)	P-values
Second opinion	2.0±2.0	3.2±2.7	-1.2 (-2.6, 0.1)	0.073
Surgical technique	3.2±2.5	4.1±3.3	-0.9 (-2.6, 0.8)	0.293
Surgeon experience	2.2±2.4	3.5±2.7	-1.4 (-2.4, -0.3)	0.012*
Wound pain	5.1±2.2	5.3±2.7	-0.3 (-1.4, 0.9)	0.611
Bruise/ecchymosis	4.1±2.2	4.1±2.5	-0.05 (-0.9, 0.8)	0.908
Surgical scar/keloid	4.5±3.3	3.9±3.1	0.6 (-0.6, 1.7)	0.324
Skin paresthesia	5.4±2.3	4.8±2.6	0.6 (-0.3, 1.6)	0.182
Overall	4.1±2.3	5.1±2.9	-1.0 (-1.8, -0.05)	0.040*

The quantitative data are presented as mean ± standard deviation (S.D.).

*Open* Open thyroidectomy, *Endo* Endoscopic thyroidectomy.

<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.

**Table 3.** Preoperative anxiety scores<sup>a</sup> regarding both approaches in patients who decided on endoscopic thyroidectomy (n=31).

Anxiety scores	Open	Endo	Mean difference	
			Open - Endo (95%CI)	P-values
Second opinion	4.3±3.0	2.3±2.2	2.0 (0.8, 3.2)	0.002*
Surgical technique	6.0±2.2	4.8±2.8	1.2 (0.1, 2.4)	0.038*
Surgeon experience	3.2±2.2	2.4±2.2	0.9 (1.7, 2.1)	0.048*
Wound pain	6.9±2.2	4.8±2.2	2.1 (1.3, 2.9)	<0.001*
Bruise/ecchymosis	6.1±2.4	3.8±2.4	2.2 (1.3, 3.2)	<0.001*
Surgical scar/keloid	7.3±2.5	3.1±2.0	4.2 (3.2, 5.2)	<0.001*
Paresthesia	6.5±2.4	3.9±2.3	2.6 (1.7, 3.5)	<0.001*
Overall	6.3±2.8	3.9±2.6	2.5 (1.3, 3.7)	<0.001*

The quantitative data are presented as mean ± standard deviation (S.D.).

*Open* Open thyroidectomy, *Endo* Endoscopic thyroidectomy.

<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.



**Table 4.** Overall preoperative anxiety scores<sup>a</sup> regarding anesthesia and major post-operative complications.

Anxiety scores	Open (n = 21)	Endo (n = 31)	Mean difference	P-values
			Open - Endo (95%CI)	
Anesthesia	5.2 ± 2.6	6.4 ± 2.5	-1.2 (-2.6, 0.3)	0.104
Wound infection	5.2 ± 3.0	6.4 ± 2.3	-1.2 (-2.6, 0.4)	0.138
Hematoma	4.8 ± 2.8	6.4 ± 3.1	-1.6 (-3.3, 0.04)	0.056
Vocal cord paralysis	5.7 ± 2.8	7.3 ± 2.3	-1.6 (-3.1, -0.2)	0.027*

The quantitative data are presented as mean ± standard deviation (S.D.)

*Open* Open thyroidectomy chosen, *Endo* Endoscopic thyroidectomy chosen.

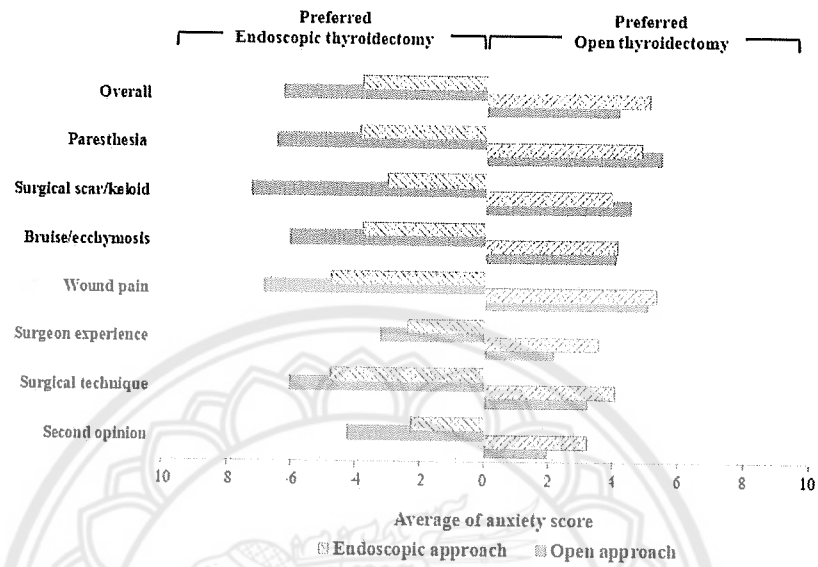
<sup>a</sup> A score of 0 represents lowest anxiety while a score of 10 represents highest anxiety.

\* Statistically significant differences were found between Open and Endo.

**Table 5.** Logistic regression analysis for evaluating the factors affecting the patients' decision on surgery approach.

Groups	Univariate		Multivariate	
	Crude OR (95 % CI)	P- values*	Adjusted OR (95 % CI)	P-values**
Sex				
	Female	5.80 (1.04, 32.31)	0.045	11.53 (0.70, 189.04) 0.087
	Male			
Age (years)		1.00 (0.95, 1.05)	1.000	
BMI (kg/m <sup>2</sup> )		0.98 (0.85, 1.14)	0.804	
Marital status	Single	1.44 (0.32, 6.54)	0.637	
	Non-single			
Chronic disease		1.03 (0.34, 3.13)	0.957	
Previous surgery	Yes	0.85 (0.27, 2.65)	0.782	
Thyroid nodule- size (cm)	≤ 3	4.73 (1.31, 17.08)	0.018	10.46 (1.23, 89.08) 0.032
	> 3			
<i>Preoperative anxiety scores difference between open and endo.</i>				
Second opinion		1.56 (1.12, 2.01)	0.007	
Surgical technique		1.21 (1.01, 1.44)	0.039	
Surgeon experience		1.63 (1.13, 2.36)	0.009	1.96 (1.02, 3.77) 0.042
Wound pain		1.59 (1.16, 2.20)	0.004	
Bruise/ecchymosis		1.57 (1.15, 2.15)	0.005	

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3	Surgical scar/keloid	1.75 (1.27, 2.42)	0.001	2.10 (1.24, 3.56) 0.006
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5	Paresthesia	1.47 (1.10, 1.97)	0.010	
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7				
8	<i>Overall preoperative anxiety scores to anesthesia and major post-operative complication.</i>			
9				
10	Anesthesia	1.20 (0.96, 1.51)	0.108	
11				
12	Wound infection	1.18 (0.95, 1.47)	0.139	
13				
14	Hematoma	1.21 (0.99, 1.46)	0.061	
15				
16	Vocal cord paralysis	1.29 (1.02, 1.63)	0.033	
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19	<hr/>			
20	<i>OR Odds ratio, CI Confidence interval, BMI Body mass index, Open Open thyroidectomy, Endo</i>			
21	<i>Endoscopic thyroidectomy.</i>			
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25	* <i>P-values</i> representing the significance of adjusted odds ratio from univariate analysis.			
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27	** <i>P-values</i> representing the significance of adjusted odds ratio from multivariate analysis.			
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**Figure 1.** Bar chart comparing the average of preoperative anxiety scores between the endoscopic and the open approach.