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Factors Associated with Physicians' Recommendations for Managing Low-Risk Papillary Thyroid Cancer

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Abstract

Background: The 2015 American Thyroid Association endorsed less aggressive management for low-risk papillary thyroid cancer (LR-PTC). We aimed to identify factors influencing physicians' recommendations for LR-PTC.

Methods: We surveyed members of three professional societies and assessed respondents' recommendations for managing LR-PTC using patient scenarios. Multivariable logistic regression models identified clinical and non-clinical factors associated with recommending total thyroidectomy (TT) and active surveillance (AS).

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Disclosure

No competing financial interests exist.

Results: The 345 respondents included 246 surgeons and 99 endocrinologists. Physicians' preference for their own management if diagnosed with LR-PTC had the strongest association with their recommendation for TT and AS (TT: OR 12.3; AS: OR 7.5, p<0.001). Physician specialty and stated patient preference were also significantly associated with their recommendations for both management options. Respondents who received information about AS had increased odds of recommending AS.

Conclusions: Physicians' recommendations for LR-PTC are strongly influenced by non-clinical factors, such as personal treatment preference and specialty.

Keywords

Thyroid cancer; overtreatment; low-risk; active surveillance; survey; thyroidectomy

Introduction

In 2015, in response to widely published concerns about overdiagnosis and overtreatment of low-risk papillary thyroid cancer, the American Thyroid Association (ATA) published guidelines endorsing active surveillance for patients with small cancers measuring ≤1cm.[1–11] The 2015 guidelines also suggested that for patients with ≤1 cm papillary cancers, thyroid lobectomy (hemithyroidectomy) is sufficient treatment.[8] The guidelines further recommended against total thyroidectomy unless there are indications for resecting the contralateral lobe.[8]

Since the release of the 2015 ATA guidelines, few if any studies have directly examined physicians' recommendations for managing patients with low-risk thyroid cancer in the United States. The aim of this study was to identify factors, both clinical and non-clinical, associated with their recommendations. We specifically sought to understand the impact of non-clinical factors such as provider characteristics, stated patient preference, and what providers would choose for themselves if diagnosed with low-risk papillary thyroid cancer. We also tested the impact of randomizing physicians to receive educational information about active surveillance prior to answering the survey questions which may guide future interventions. With the introduction of active surveillance in the most recent guidelines, scenarios focused on cases of patients with small cancers who might be considered appropriate for active surveillance and also most at risk for overtreatment with total thyroidectomy.

Materials and Methods

Study Population

We conducted a web-based survey of active members of the ATA, the American Association of Endocrine Surgeons (AAES), and the American Head and Neck Society (AHNS). These organizations represent the societies of physicians who specialize in treating thyroid cancer. To be included in the study, respondents had to: (1) be actively practicing in the United States, (2) treat adult patients with thyroid cancer, and (3) identify as an endocrinologist, general surgeon, endocrine surgeon, head and neck surgeon, or otolaryngologist. The

University of Wisconsin (UW) Institutional Review Board (2017–0373) determined the study to be exempt from human subjects review.

Survey Administration

To comply with each society's protocols, the ATA and AHNS distributed the survey invitation to members by email; for the AAES, the study team emailed members directly. Survey invitations were emailed between August and September 2017. After the initial email, we sent two reminder invitations.[12] The emails contained a link to the survey which was administered using Qualtrics® software. To test the impact of providing educational information about active surveillance, we randomized respondents 1:1 to receive or not receive a 1-page verbatim summary of the relevant ATA guidelines about active surveillance as well as peer-reviewed evidence on the outcomes of active surveillance.[8,13,14] Respondents were eligible to win a small monetary prize by entering a drawing.

Instrument Development

We developed the survey based on semi-structured interviews with 24 thyroid surgeons and endocrinologists.[3] Clinician stakeholders (n=10) reviewed survey questions and concepts to confirm content and face validity. Experts from the University of Wisconsin Survey Center ensured that the format and wording of questions were appropriate. We performed cognitive testing of all questions to make sure interpretation was consistent and as intended. The survey instrument was piloted with a multidisciplinary group of thyroid surgeons and endocrinologists.

In addition to demographics and questions about ATA guideline use, the survey included 11 patient scenarios that are summarized in Table 1. All scenarios described a female patient with a low-risk papillary thyroid cancer specifying the cancer was "*a biopsy-proven, solitary papillary thyroid cancer with no suspicious features, including no extrathyroidal extension or lymphadenopathy on ultrasound and no family history of thyroid cancer or history of head and neck radiation*." To examine the impact of different clinical factors on decision-making, the scenarios altered: tumor size (0.4 cm, 0.8 cm, 1.1 cm, and 1.5 cm), patient age (20-year-old (yo), 45yo, and 75yo), history of hypothyroidism on levothyroxine (LT4), and life expectancy in an older patient (less than or greater than 10 years). The scenarios were presented in the order described which was the same order for all respondents. Clinician stakeholders unanimously agreed that all scenarios described patients with low-risk cancer.

Three additional scenarios assessed the impact of stated patient preference for a specific management—total thyroidectomy, lobectomy, or active surveillance—on physician recommendations. Respondents were also asked their preference for their own management if they were hypothetically diagnosed with a 0.8 cm, solitary low-risk papillary thyroid cancer that had no suspicious features, and they had no adverse clinical history. Response options to all questions included total thyroidectomy, thyroid lobectomy, active surveillance, and ethanol ablation.

Questions also assessed respondents' beliefs about the degree to which the following factors influence patients' treatment preferences: the surgeon's or endocrinologist's recommendation, fear of cancer, peace of mind from surgery, need for life-long medication,

fear of surgery, and the desire to avoid completion thyroidectomy. Additionally, respondents were asked the following questions from validated instruments to assess risk tolerance and uncertainty, "How much do you agree with the following statements: 'In my own life, I rarely, if ever, take risks when there is another alternative' and 'Uncertainty in patient care makes me uneasy.'"[15–17] Response options were on a unipolar, 5-point Likert scale ranging from "none/not at all" to "a great deal."

Statistical Analysis

We summarized physician demographics and responses to the 11 patient scenarios using frequency distributions and made initial comparisons based on specialty using Chi-square and Student's t-tests as appropriate. To examine clinical factors that impact providers' recommendations, we compared responses for each case scenario to a reference case using Chi-square analysis. The reference case was a 45yo female with a biopsy-proven, 0.8 cm solitary, low-risk papillary thyroid cancer with no adverse features as described above.

To examine non-clinical factors related to the extremes of management recommendations (meaning total thyroidectomy and active surveillance), we categorized respondents based on their responses to the patient scenarios as described by Haymart et al.[18] Respondents who recommended total thyroidectomy for any of the 8 scenarios (denoted with a * in Table 1) were compared to those who did not recommend total thyroidectomy for any scenario. Similarly, respondents who recommended active surveillance for any of 5 scenarios were classified as willing to recommend active surveillance (denoted with a "+" in Table 1) and compared to those who did not recommend active surveillance for any scenario. In the active surveillance analysis, we excluded responses to the case of a 75yo woman with <10 years life expectancy because nearly 90% of respondents recommended surveillance. Chi-squared and Student's t-tests were used to assess bivariate associations between treatment recommendations for categorical factors and continuous factors, respectively. Factors with a p-value of ≤0.15 on bivariate analysis or that were clinically relevant were included in a logistic regression model to estimate adjusted odds ratios of recommending each treatment. All statistical analyses were performed using SAS software, Version 9.4 (SAS Institute Inc., Cary, NC). A p-value of <0.05 defined statistical significance.

Results

Demographics

Overall, 345 physicians completed the survey—130 (37.7%) general surgeons, 116 (33.6%) otolaryngologists, and 99 (28.7%) endocrinologists. Table 2 summarizes respondent demographics by specialty. Most responders were male (68.4%), white (69.1%), and worked in tertiary academic centers (63.7%). General surgeons and ENTs were examined together as "surgeons" because the two specialties were similar demographically and with respect to their recommendations for scenarios, though the general surgeons had a higher mean annual thyroidectomy volume (p<0.0001).

Clinical factors affecting management recommendations

Treatment recommendations for the 11 patient scenarios are shown in Figure 1. For the reference case (a 45yo female with a solitary 0.8 cm papillary thyroid cancer with no suspicious features or adverse history), 22 (6.4%) respondents recommended total thyroidectomy, 235 (68.7%) recommended thyroid lobectomy, and 81 (23.4%) recommended active surveillance. Few respondents recommended alcohol ablation (n=5, 1.5%).

Non-clinical factors affecting management recommendations

Specialty: Surgeons vs. Endocrinologists—Comparison of management recommendations by specialty demonstrated that surgeons were significantly less likely than endocrinologists to recommend active surveillance for the 8 patient scenarios that assessed clinical factors except for two cases—when the tumor size was 1.5 cm or the patient was 75 yo with <10-year life expectancy. In these cases, few respondents recommended active surveillance for a 1.5 cm papillary cancer (1.2% of surgeons vs. 3.1% endocrinologists, p=NS) and most recommended surveillance for a 75yo with <10-year life expectancy (84.6% vs. 92.6%, p=NS, respectively). On the other hand, recommendations for total thyroidectomy were similar between the two specialties for all cases except when the patient in the scenario was already on levothyroxine; for this case, surgeons were more likely to recommend total thyroidectomy (33.5% vs. 16.1%, p<0.00001).

Patient and Physician Preference—For all scenarios that assessed patient management preference (active surveillance, lobectomy, and total thyroidectomy), the proportion of respondents that recommended that treatment increased significantly compared to the reference case (p<0.001 for all). For example, if the patient in the scenario preferred a total thyroidectomy for a solitary 0.8 cm papillary thyroid cancer, respondents were 11.1-times more likely to recommend this surgery compared to the same case with no stated preference (71.3% vs. 6.4%, p<0.0001). Respondents were also significantly more likely to prefer a total thyroidectomy for their own treatment if hypothetically diagnosed with a solitary 0.8 cm papillary thyroid cancer with no suspicious features compared to the reference case—a 45yo female with the same tumor characteristics (16.2% vs. 6.4%, p<0.001). This preference was independent of respondents' self-reported age or gender (p>0.05).

Beliefs about Patients' Treatment Preferences—When respondents were asked about factors they believe influence patients' treatment preferences, 89.2% believed *fear of cancer* influenced patients "quite a bit" or "a great deal" (Figure 2). The majority of respondents also believed patients are influenced "quite a bit" or "a great deal" by the *surgeon's or endocrinologist's recommendation* (87.7%) and by *peace of mind from surgery* (76.7%). When examined by specialty, surgeons' and endocrinologists' beliefs were comparable except surgeons were less likely to believe patients are influenced "a great deal" by the *need for life-long medication* (12.6 % vs. 20.2%, p=0.03).

Factors Associated with Recommending Total Thyroidectomy—Respondents who recommended total thyroidectomy for any of the clinical case scenarios were more likely to believe patients are influenced by *peace of mind from surgery* (81.3% vs. 71.0%,

p=0.02) and *desire to avoid completion thyroidectomy* (36.5% vs. 24.3%, p=0.01) compared to those who did not recommend total thyroidectomy (Figure 2). Those who recommended total thyroidectomy were also more likely to agree “quite a bit” or “a great deal” that they *rarely take risks in their own life if there is an alternative* (34.6% vs. 19.8%, p=0.002) and that *uncertainty in patient care makes them uneasy* (29.8% vs. 19.6%, p=0.03).

The results of multivariable logistic regression modeling non-clinical factors associated with recommending total thyroidectomy are shown in Figure 3. Physicians who preferred total thyroidectomy for their own treatment had the greatest odds of recommending total thyroidectomy for the patient scenarios (OR 12.28, 95% CI 4.12–36.59; Figure 3). Other factors significantly associated with physicians recommending total thyroidectomy included surgeon specialty, patient stated preference for total thyroidectomy, and the belief that patients’ preferences are strongly influenced by the desire to avoid completion thyroidectomy. Female respondents also had greater odds of recommending total thyroidectomy. Receipt of information about active surveillance and working in an academic practice setting tended to decrease the odds of recommending total thyroidectomy, though this finding did not reach statistical significance. Surgeon volume was not associated with their recommendation.

Factors Associated with Recommending Active Surveillance—Similarly, physicians who preferred active surveillance for their own treatment also had the greatest odds of recommending active surveillance for the scenarios (OR 7.53, 95% CI 3.13–18.16; Figure 4). Respondents also had greater odds of recommending active surveillance if the patient in the scenario preferred surveillance or the physician was an endocrinologist. Those who were randomized to receive information about active surveillance also had greater odds of recommending surveillance (OR 2.11, 95% CI 1.22–3.64). Meanwhile, physicians who believed patients desire *peace of mind from surgery* had decreased odds of recommending surveillance. Respondents’ recommendations for active surveillance were not associated with their self-reported familiarity with the 2015 ATA guidelines nor their self-reported management being in line with the ATA guidelines. Therefore, these variables were not included in the final models.

Discussion

In this survey of physicians, the major non-clinical factors influencing treatment recommendations for low-risk papillary thyroid cancer were, from most to least influential: physicians’ own personal treatment preference, their specialty, patients’ stated preference, and physicians’ beliefs about what factors influence patients’ treatment choice. Physicians offered active surveillance more often when they received information about this management prior to starting the survey. As expected, clinical attributes including tumor size, patient age, and patient comorbidities also affected physicians’ recommendations. These findings are important considering other results from surveying this population show physicians want better data and clearer guidance regarding active surveillance. This study is the first we are aware of to demonstrate the robust influence of physicians’ own treatment preference, their specialty, and patients’ stated preferences on physicians’ management recommendations for small, low-risk papillary thyroid cancer.

Studies in prostate and lung cancer have shown similar results with respect to the robust effect of non-clinical factors such as physicians' own personal treatment preference.[19–21] Data demonstrate that physicians who treat low-risk prostate cancer are most likely to recommend the primary treatment modality delivered by their specialty.[22–25] Urologists are more likely to recommend radical prostatectomy, while radiation oncologists are more likely to recommend brachytherapy. Physician specialty has also been associated with recommendations in patients with coronary artery disease and other conditions requiring intervention.[26–28] Therefore, specialty bias is not unique to those treating low-risk thyroid cancer, but does have significant implications for patients, potentially limiting the management options made available to them. Disclosure of specialty bias to patients is one solution to this paradigm, but has been shown to actually increase patients' trust and likelihood of choosing the treatment concordant with the physicians' specialty.[29] Thus, other efforts, such as decision aids or decision boards, are needed to ensure patients are aware of all appropriate available treatment options to make an informed choice. Increasing patient awareness of all treatment options is one avenue for shifting practice in line with the ATA guidelines and increase adoption of active surveillance.

This study also demonstrated that physicians' recommendations are associated with their beliefs about why patients prefer a particular management strategy. Specifically, the belief that patients wish to avoid completion thyroidectomy was associated with increased odds of recommending total thyroidectomy, while the belief that patients want peace of mind from surgery was associated with decreased odds of recommending active surveillance. Actual elicitation of patients' preferences is crucial for selecting the optimal management strategy, yet patient-provider communication about preferences often falls short or does not occur at all.[30–33] Many physicians lack experience and training in preference elicitation and shared decision-making, which opens the door for their own biases and beliefs to effect the management choice.[34,35] Patient- and physician-focused interventions are needed to ensure patients are presented with all available management options in an unbiased manner. Such interventions could include the development of unbiased patient decision support tools or provider communication training.[36,37]

Patients' stated management preference also significantly influenced physicians' recommendations in this study. Surprisingly, over 70% of respondents recommended total thyroidectomy for a solitary, 0.8 cm low-risk papillary thyroid cancer without adverse features or history when the patient preferred this surgery despite ATA guidelines recommending lobectomy unless there are "indications for resecting the contralateral lobe."[12] This finding suggests that providers believe patient preference is an indication for resection of the contralateral lobe. The reasons behind this phenomenon deserves further investigation as fear and anxiety may be driving patients' choices and may result in decision regret if they experience adverse outcomes or later learn that the guidelines indicate lobectomy would have been adequate treatment or perhaps kept them from needing thyroid hormone replacement. Multiple studies, including one in patients with thyroid cancer, show that providers can guide clinical decision-making and use their knowledge to influence management choice.[38–40] This guidance may be necessary to avoid "scared decision-making" and potential overtreatment of patients with small papillary cancers.

An important factor associated with physicians' recommendations for low-risk papillary thyroid cancer in this analysis was receipt of information about active surveillance. Only one-fourth respondents recommended active surveillance for a 45 yo female with a 0.8 cm papillary thyroid cancer despite being 'a great deal' familiar and their practice in line with the ATA guidelines. This finding supports the need for further research evidencing the benefits of active surveillance and provider education of this treatment modality. Physicians randomized to receive information about surveillance had increased odds of recommending this management and tended to have decreased odds of recommending total thyroidectomy. This finding suggests that educating providers about non-operative management may increase utilization of active surveillance, though the long-term durability is unknown. Merely mentioning active surveillance could also cause an anchoring effect, making total thyroidectomy seem more extreme. Our findings from surveying this population suggests that physicians may be more likely to recommend active surveillance if they had more information about this non-operative approach. Therefore, dissemination of information through other specialty and national societies could help shift practice. While the ATA and thyroid-related specialty societies disseminate information through emails, webinars, and meetings, this avenue may produce an echo chamber effect. Partnership with and dissemination through larger organizations like the American Medical Association or American Academy of Family Physicians may be required to increase adoption of active surveillance.

While the results of this study are unique, the analysis has limitations. First, we were unable to calculate an accurate response rate because of significant overlap in organization membership. Additionally, the organizations did not all provide information about the number of potential eligible respondents invited to take the survey. Other limitations include the possibility of nonresponse and selection bias. Respondents were members of specific organizations where the majority performed a high-volume of thyroid surgery annually and were from academic centers, which limits the generalizability of the results. While high-volume surgeons perform only 20% of thyroid surgery in the United States, they represent key stakeholders in determining guidelines.[41] In addition, the organizations sampled include thought leaders in the field who drive practice change and may be more ready to use less aggressive management strategies. We also did not ask about local access to expert thyroid surgeons or local institutional and health-system-related factors that may influence respondents' management recommendations. Another consideration includes the use of hypothetical patient scenarios. Respondents may feel the need to select what they believe is the "right" answer as opposed to how they actually practice. However, the finding that over 70% of respondents would recommend total thyroidectomy when not supported by guidelines suggests that respondents' answers were consistent with their practices. Despite these limitations, the findings of this study raise important issues related to potential provider bias in management recommendations for patients with thyroid cancer. The survey was also supported by robust development process, adequate sample size, had a diversity of responder specialties, and enrolled a national cohort.

Conclusion

Multiple factors influence physicians' recommendations for managing patients with small low-risk papillary thyroid cancer including their non-clinical attitudes, beliefs, and preferences. Strongest among these factors is what physicians would choose for themselves if diagnosed with a small papillary cancer. Until providers feel confident choosing active surveillance for their own management if diagnosed with a small low-risk papillary thyroid cancer, they are unlikely to recommend this management strongly for their patients. Physician self-awareness of how personal and specialty-associated biases impact their recommendations is a critical first step to ensuring patients with low-risk thyroid cancer receive management that aligns with their goals and values. The results of this study suggest that educating physicians with guidelines and evidence may increase use of less invasive interventions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights:

- Physician recommendations for low-risk papillary thyroid cancer are multifactorial.
- Physicians' personal treatment preference is associated with their recommendations.
- Physician specialty and stated patient preference also influence recommendations.

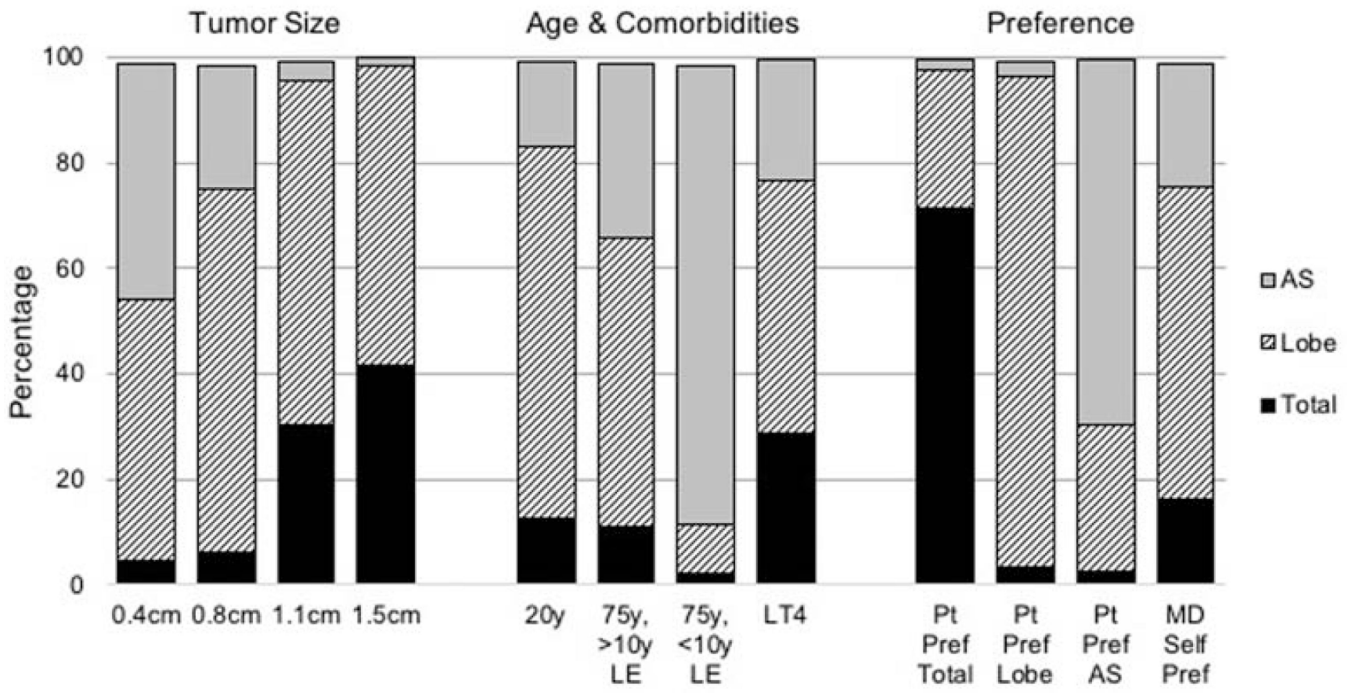

Figure 1:

The graph summarizes respondents' recommendation for managing each case scenario. Responses are organized by scenarios that altered tumor size (left), patient age and comorbidities (middle), and patient (pt) preference (Pref) (right). Unless otherwise specified, the patient in each scenario is a 45-year-old (y) female with a solitary, clinically node-negative (cN0) 0.8 centimeter (cm) papillary thyroid cancer (PTC). The bar on the far right depicts physicians' (MD) preference for their own management if hypothetically diagnosed with a solitary, cN0, 0.8 cm PTC and had no adverse family or clinical history. Abbreviations: life expectancy (LE), levothyroxine (LT4), total thyroidectomy (total), thyroid lobectomy (lobe), active surveillance (AS).

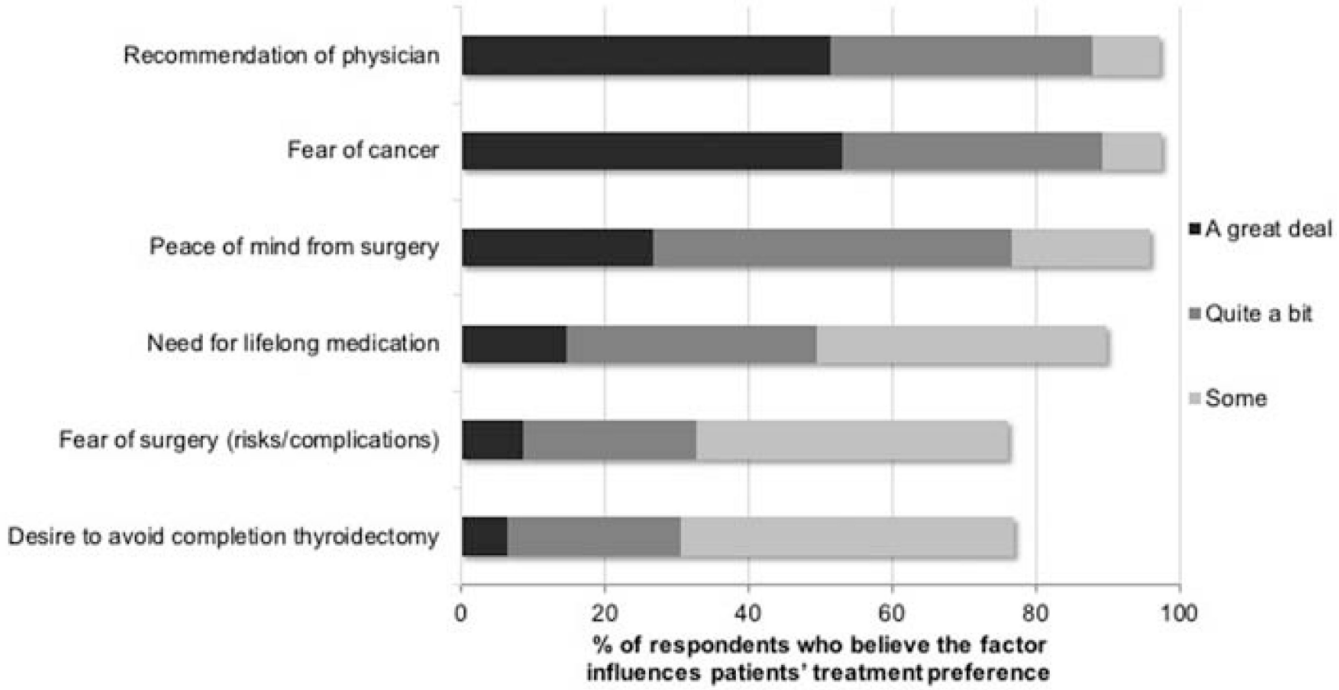

Figure 2:

Bars indicate the percent of respondents who believe patients' treatment preferences are influenced "quite a bit," "a great deal," or "some" by the factors listed on the left. Categories "none" and "a little" are not shown.

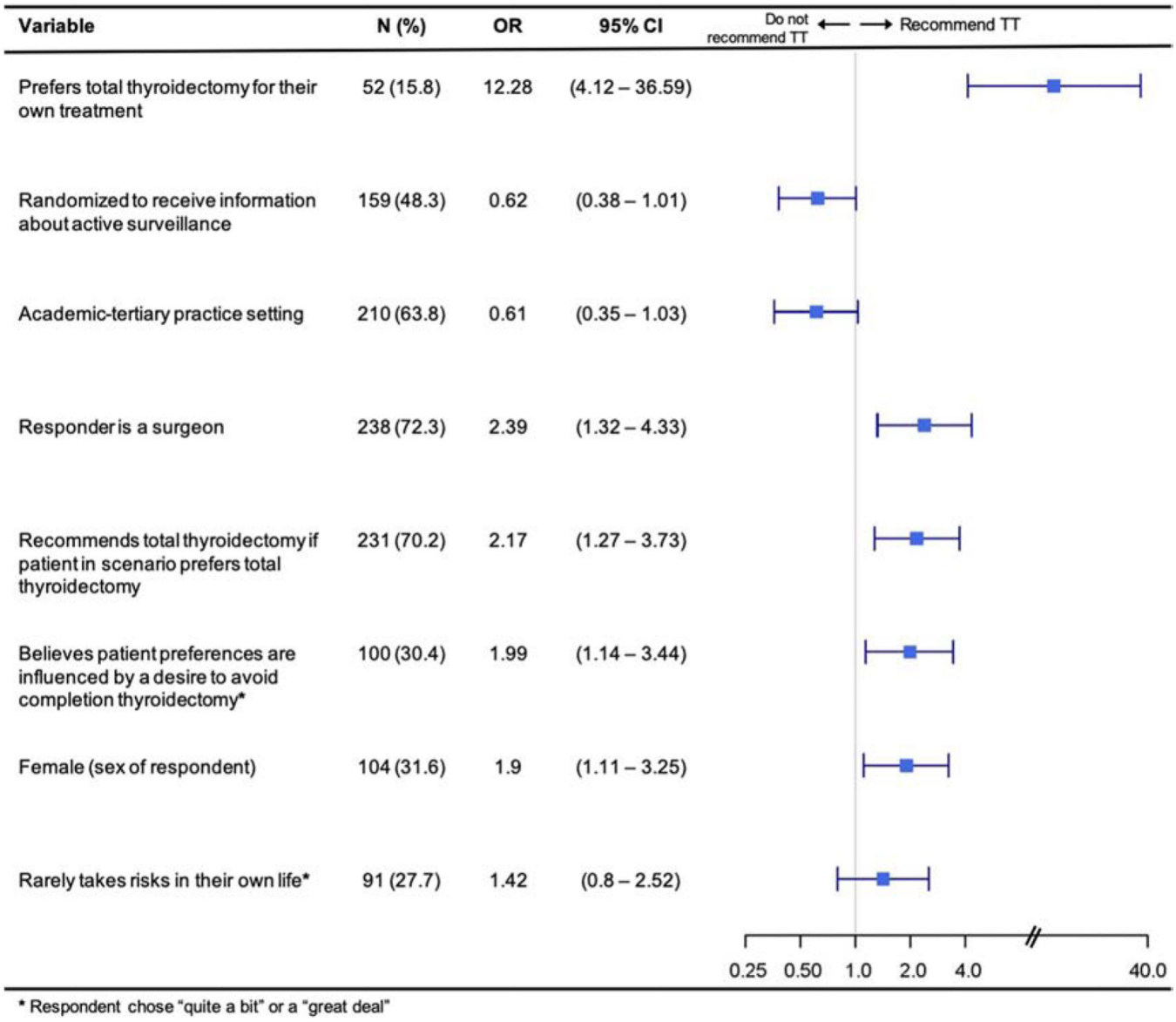

Figure 3:

Multivariable Logistic Regression Model of Non-Clinical Factors Associated with Physicians Recommending Total Thyroidectomy (TT) (N=329)

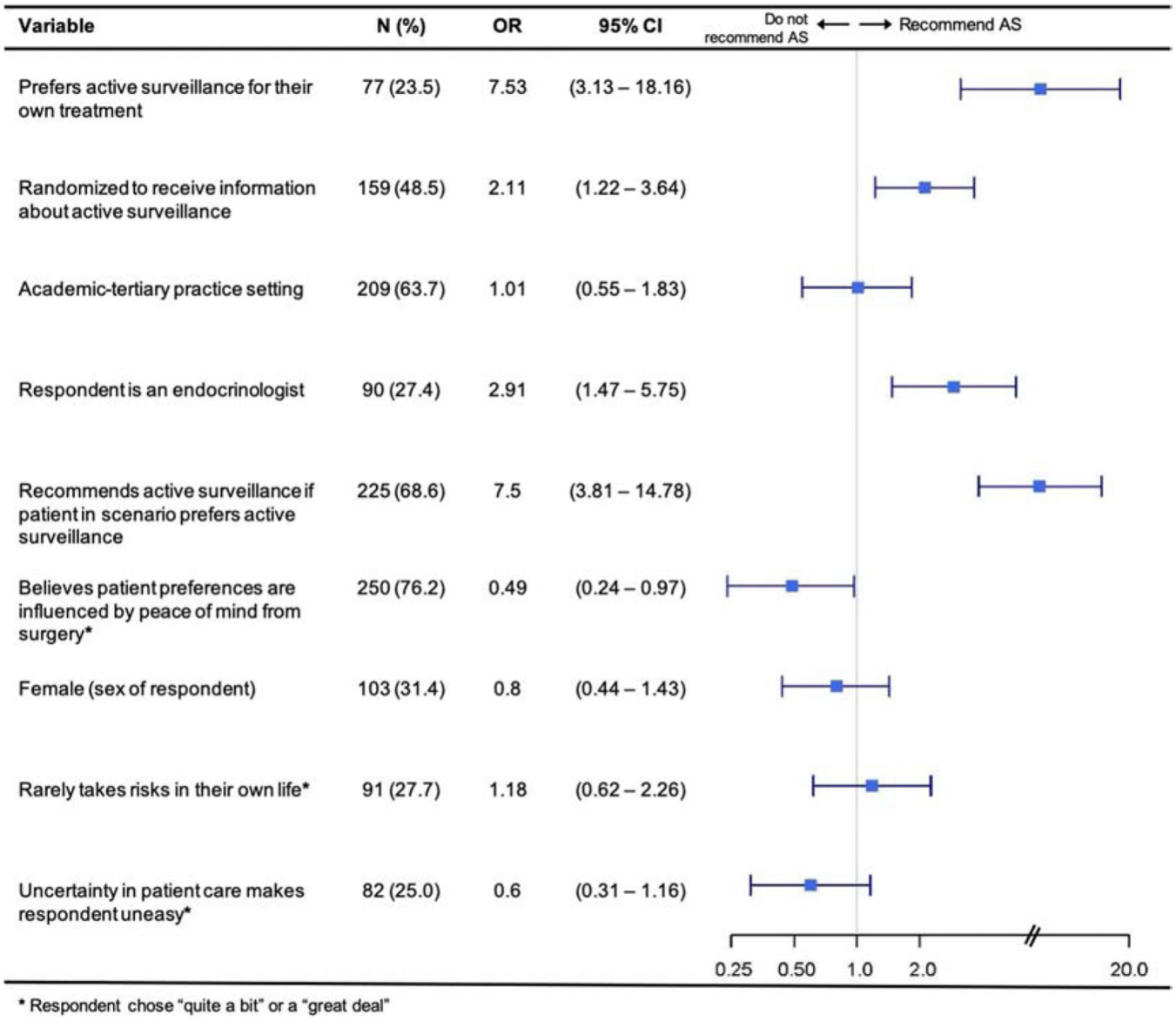

Figure 4:

Multivariable Logistic Regression Model of Non-Clinical Factors Associated with Physicians Recommending Active Surveillance (AS) (N=328)

TABLE 1.

Summary of the 11 patient scenarios included in the survey

Clinical Factors	Case Details
Tumor Size	0.4 cm *+
	0.8 cm *+ ← REFERENCE CASE
	1.1 cm *
	1.5 cm *
Age and Comorbidities	20 yo *+
	75 yo, >10 years LE *+
	75 yo, <10 years LE *
	On LT4 *+
Non-Clinical Factors	
Patient Preference	Total thyroidectomy (TT)
	Lobectomy (Lobe)
	Active surveillance (AS)

Note: Patient gender is female, age is 45 years, and papillary thyroid cancer tumor size is 0.8 cm for all cases except where otherwise specified.

Abbreviations: yo: year-old; LE: life expectancy, LT4: thyroid hormone replacement

*Respondents who recommended TT for any of these 8 case scenarios were included in the regression analysis for TT.

+Respondents who recommended AS for any of these 5 case scenarios were included in the regression analysis for AS.

Table 2:

Respondent Demographics by Specialty

Variable	GS N (%)	OTO N (%)	ENDO N (%)	Total N (%)
N	130 (37.7)	116 (33.6)	99 (28.7)	345
Age *	45.8 ± 9.9	46.2 ± 10.7	51.4 ± 14.9	47.5 ± 11.6
Sex				
Male	81 (62.8)	91 (79.8)	60 (62.5)	232 (68.4)
Race/Ethnicity				
White	90 (70.9)	80 (70.2)	63 (65.6%)	233 (69.1)
Black	1 (0.8)	1 (0.9)	0 (0)	2 (0.6)
American Indian/Alaska native	1 (0.8)	2 (1.8)	0 (0)	3 (0.9)
Asian	21 (16.5)	21 (18.4)	22 (22.9)	64 (19.0)
Hispanic	9 (7.1)	7 (6.1)	7 (7.3)	23 (6.8)
Other	5 (3.9)	3 (2.6)	4 (4.2)	4 (3.6)
Practice Setting				
Academic tertiary	84 (65.1)	84 (74.3)	48 (49.5)	216 (63.7)
Academic-affiliated hospital	25 (19.3)	13 (11.5)	18 (18.5)	56 (16.5)
Community hospital	8 (6.2)	7 (6.2)	3 (3.1)	18 (5.3)
Private practice	10 (7.8)	8 (7.1)	25 (25.8)	43 (12.7)
Other	2 (1.6)	1 (0.9)	3 (3.1)	6 (1.8)
Years in Practice *	11.9 ± 10.5	13.2 ± 11.6	19.2 ± 14.6	14.3 ± 12.0
Annual Thyroidectomy Volume *	139.2 ± 92.6	68.2 ± 68.5	N/A	105.8 ± 81.2
Annual New or Established Thyroid Cancer Patient Volume *	87.8 ± 80.0	84.6 ± 133.3	216.0 ± 345.0	123.7 ± 211.9
Familiarity with 2015 ATA Guidelines				
A little/Not at all	0 (0)	2 (1.7)	1 (1.0)	3 (0.9)
Somewhat	5 (3.9)	8 (6.9)	5 (5.1)	18 (5.2)
Quite a bit	40 (31.0)	44 (37.9)	34 (34.7)	118 (34.4)
A great deal	84 (65.1)	62 (53.5)	58 (59.2)	204 (59.5)
Management in-line with 2015 ATA Guidelines				
A little/Not at all	3 (2.3)	1 (0.9)	2 (2.0)	6 (1.8)
Somewhat	13 (10.1)	14 (12.1)	15 (15.2)	42 (12.2)
Quite a bit	62 (48.1)	57 (49.1)	46 (46.5)	165 (48.0)
A great deal	51 (39.5)	44 (37.9)	36 (36.4)	131 (38.0)

GS: general surgeons, OTO: otolaryngologists; ENDO: endocrinologists; ATA: American Thyroid Association.

* Shown as Mean ± standard deviation.