

Patterns of Clinical Management of Hypothyroidism in Adults: An Electronic Survey of Physicians from the Middle East and Africa

Salem A. Beshyah¹, Ibrahim H. Sherif², Huda E. Mustafa³, Hussein F. Saadi⁴

¹Department of Medicine, Dubai Medical College, Dubai, ²Health Plus Center for Diabetes and Endocrinology, ⁴Cleveland Clinic Abu Dhabi, Abu Dhabi, UAE, ²Al Sindan Clinic, Tripoli, Libya

Abstract

Background: Hypothyroidism is a common endocrine disorder that is managed by a wide range of physicians. There are no data on the pattern of clinical management of hypothyroidism in the Middle East and Africa (MEA) region. **Objectives:** We sought to document current practices in the management of primary hypothyroidism in the MEA region and compare these with international recommendations and practices elsewhere. **Materials and Methods:** A convenience sample of physicians practicing in the MEA in relevant disciplines were invited to take a web-based survey consisting of previously validated multiple-choice questions dealing with investigation and treatment of an index case of overt primary hypothyroidism in general and in three special situations. **Results:** Out of complete 397 responses, 368 were eligible for inclusion in the analysis. The majority were endocrinologists and internal medicine specialists; 82.2% of them have been in clinical practice for 10 years or more. Overt hypothyroidism would be treated using L-T4 alone by 97.2% of respondents; 1.7% would use a combination of L-T4 and liothyronine (L-T3) therapy. The rate of replacement would be gradual (66.5%), an empiric dose, adjusted to achieve target levels (14.7%); or a calculated full replacement dose (18.5%). A target thyroid-stimulating hormone (TSH) of 2.0–2.9 mU/L was favored in the index case of overt hypothyroidism (by 34.4%) followed by a target of 3.0–3.9 mU/L (by 26.0%) of respondents. However, a target of 4.0–4.9 mU/L was the most commonly selected TSH target for an octogenarian (by 33.5% of respondents). Persistent hypothyroid symptoms despite achieving a target TSH would prompt testing for other causes by 86.9% of respondents, a change to L-T4 plus L-T3 therapy by 5.8%, and an increase in the thyroid hormone dose by 4.6%. Evaluation of persistent symptoms would include measurements of complete blood count (82.4%), complete metabolic panel (68.7%), morning cortisol (65.3%), Vitamin B12 levels (54.5%), and serum T3 levels (27.9%). Subclinical disease with a TSH 7.8 mU/L would be treated without further justification by 9.0% of respondents, or in the presence of positive thyroid peroxidase antibodies (65.3%), hypothyroid symptoms (65.0%), high low-density lipoprotein (51.7%), or a goiter (36.7%). The TSH target for a newly pregnant patient was 2.0–2.4 mU/L for 28.5% of respondents, with 15.8% preferring a TSH target of 1.5–1.9 mU/L. Thyroid hormone levels would be checked every 4 weeks during pregnancy by 62.9% and every 8 weeks by an additional 17.6%. A hypothyroid patient with a TSH of 0.5 mU/L who becomes pregnant would receive an immediate L-T4 dose increase by only 28.5% of respondents. **Conclusions:** The survey revealed that (1) nearly exclusive preference for L-T4 alone for therapy, (2) use of age-specific TSH targets for replacement therapy, (3) a low threshold for treating mild thyroid failure, (4) complacent and variable attention to TSH targets in the pregnant and prepregnant woman, and (5) a highly variable approach to both the rate and means of restoring euthyroid status for overt disease. Both alignments with and divergence from guidelines were detected. The results should help in directing focused educational activities in the region, providing a baseline for future monitoring of practices.

Keywords: Clinical practice guideline, pattern, persistently symptomatic hypothyroidism, primary hypothyroidism, subclinical hypothyroidism, t4/t3 combination, thyroid and pregnancy, thyroid antibodies, thyroxine hypothyroidism, trends

INTRODUCTION

Hypothyroidism affects 2%–5% of the general population in several studies from North America and Europe.^[1–4] Patients with uncorrected disease suffer significant morbidity and have

Address for correspondence: Dr. Salem A. Beshyah,
P. O. Box 59472, Abu Dhabi, UAE.
E-mail: beshyah@yahoo.com

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an increased risk of cardiovascular disease and neurocognitive impairment.^[5] Patients may seek help and end under the care of various clinical disciplines. Levothyroxine, the treatment of choice, is inexpensive, easy to administer, and in most cases restores well-being while normalizing thyroid function.^[6] Still, a number of controversies remain, including the treatment threshold in patients with mild or subclinical disease,^[7] the need for age-specific targets for serum thyroid-stimulating hormone (TSH) levels,^[8] whether administration of L-T4 alone provides adequate tissue level triiodothyronine (T3) levels,^[9] optimal control of thyroid function during pregnancy,^[10] and screening indications for the detection of hypothyroidism in the general population and in women planning pregnancy.^[11]

Several clinical practice guidelines (CPGs) have recently been published by international organizations dealing with diagnostic evaluation and treatment strategies for adults with hypothyroidism.^[12-16] Practicing clinicians are usually encouraged to use the recommendations contained in those guidelines in conjunction with their own clinical judgment and within the context of individual patient circumstances.^[12-16] Attempts have been made to ascertain the extent to which current practices differ from recommendations made in the hypothyroidism CPG.

A couple of studies surveyed the clinical management practices for patients with hypothyroidism in some parts of the world.^[17,18] Most notable is the international survey by Burch *et al.*^[17] This survey included a minority representation (48 responses) from the Middle East and Africa (MEA) region.^[17] It is anecdotally stated that clinical practice in the MEA region follows international guidelines by virtue of past training and affiliations to North American and European associations. However, this assumption has never been verified. We have therefore conducted this survey to scope the patterns of clinical practice relating to the management of primary hypothyroidism in adults in the MEA region aiming to provide a baseline database to direct future education and research.

MATERIALS AND METHODS

Objectives

We aimed to (1) document current practices in the general approach to the management of primary hypothyroidism in adults; (2) evaluate management modifications in unique clinical circumstances such as subclinical hypothyroidism, pregnancy, and old age; and (3) compare the practice in MEA with published guidelines.

Target population

In the absence of a single MEA regional endocrine society with a membership list that can define a study population, the target population was identified from a list of electronic mails pooled from continuous professional development delegates, speakers, authors, or members of various scientific groups or forums in various parts of the MEA region. Consequently, a number of questions were added to the survey to help define the demographic professional profiles of the respondents and their practices similar to our previously published.^[19-25]

Survey management

A web-based commercial survey management service (SurveyMonkey, Palo Alto, CA, USA) was used. All participants received an initial E-mail that explained the rationale of the survey and what is required from the consented respondents, followed by five subsequent reminder E-mails during the study period. Each message included an explanation of the rationale and method of participation, full credentials, and contact details of the principal investigator together with a unique E-mail-specific electronic link to the questionnaire. Repeated submissions from the same IP address were automatically blocked by the survey service. The survey website was open for the 12-month study period from July 1, 2015, to June 31, 2016. In the end, survey responses were collected and stored electronically for an anonymous analysis.

Survey questionnaire

The questionnaire itself was analogous to the one used in the international survey of 2013 by Burch *et al.*^[17] The survey was served in its original English. The survey included questions covering diagnostic evaluation, choice of therapy, and follow-up for an index case of primary overt hypothyroidism followed by three clinical variants [Table 1]. The variants include (1) a patient with persistent symptoms of hypothyroidism despite having achieved target thyroid hormone levels, (2) a patient anticipating pregnancy, and (3) a patient with subclinical hypothyroidism [Table 1].

Data analysis

Summary statistics were prepared for responses to each question. Because not every participant answered all questions, the percentage of respondents providing a given answer was calculated individually for each question, using the number of respondents to that question in the denominator.

RESULTS

Participants' demographic and professional profiles

Four groups represented the majority of respondents, namely 113 adult endocrinologists (36.1%), 54 physicians in general internal medicine (17.3%), 51 primary care physicians (16.3%), and 49 general internal physicians with special interest and practice in endocrinology (15.7%). The remainder were pediatric endocrinologists (9.0%), obstetrician/gynecologist (3.2%), surgeons (1.9%), and nuclear medicine physicians (0.64%). The majority (82.2%) were in clinical practice for over 10 years (34.9% for 10–20 years and 47.8% for over 20 years) and 17.3% have been practicing for <10 years. Over half (55.0%) of respondents hold senior consultant/attending physician positions, 27.2% were middle-grade physicians, and the remainder were in other grades. Most respondents (77.4%) were practicing clinicians working mainly in clinical health services and 22.6% have full-time university appointments. Reported professional affiliations included membership of the American Association of Clinical Endocrinologists and local chapters (50.6%), regional endocrine societies (45.8%), the US Endocrine

Society (22.0%), European Society of Endocrinology (16.1%), American Thyroid Association (10.7%), UK Society for Endocrinology (6.0%), and European Thyroid Association (3.0%). Access to thyroid-related diagnostic and treatment resources as indicated clinically was reported as follows: measurements of thyroid hormones (97.4%), thyroid ultrasound imaging (90.5%), thyroid antibodies (86.2%), antithyroid drug therapy (84.6%), fine-needle aspiration and cytological examination (68.2%), thyroid surgeon (65.3%), an ophthalmologist with expertise in thyroid eye disease (55.4%), and nuclear medicine scanning (49.5%).

Diagnostic evaluation of the index case

Figure 1 shows the percentage of respondents ordering the listed laboratory tests for the index case compared to the 2013 international survey.^[17] The most remarkable difference was a higher use of ultrasound examination in hypothyroid patients undergoing initial evaluation (66.9% MEA versus 44.4% in

the whole of the 2013 international survey).^[17] Greater request for measurement of lipid profiles was also noted followed by measurements of antithyroglobulin antibodies and serum T3. Repeating measurements of TSH and T4 and measuring thyroid peroxidase (TPO) antibody (Ab) testing was not remarkably different in MEA from the rest of the world [Figures 1].

Treatment choices for the index case

Thyroid hormone preparation

Out of 355 respondents, 71.6% would use a brand name of L-T4, and 25.6% would use a generic formulation for the initial therapy of overt hypothyroidism [Figure 2]. Six respondents (1.7%) selected combined L-T4 and L-T3 as initial therapy in the index case. Only three respondents (0.9%) selected thyroid extract as initial therapy. Table 2, Figures 1 and 2 shows the responses in the MEA regions and the international survey of 2013. There was greater use of brand-name

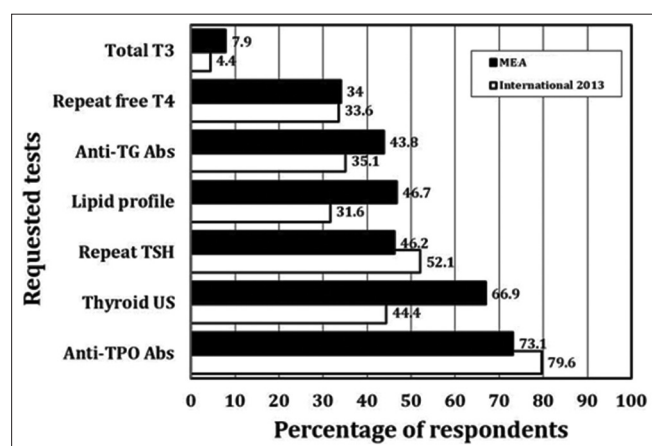


Figure 1: Percentage of participants who would request the listed testing in a patient with overt hypothyroidism. The Middle East and Africa data (closed) are from the present study and the international 2013 survey data (open) are from reference 17

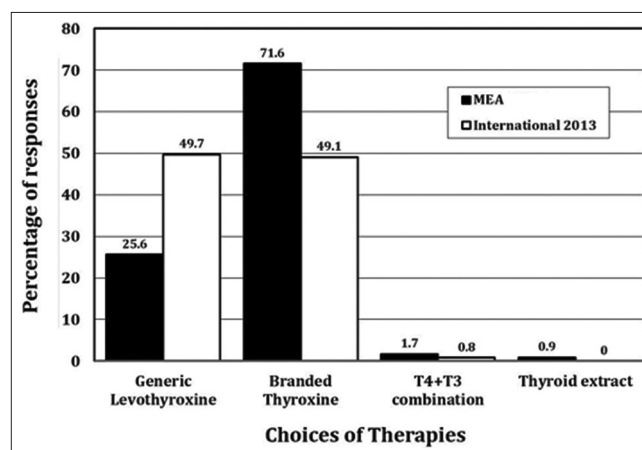


Figure 2: The percentage responses reflect choices of thyroid hormones for initial therapy. The Middle East and Africa data (closed) are from the present study and the international 2013 survey data (open) are from reference 17

Table 1: The clinical details of the index case and the variants

Case	Description
Index case	A 52-year-old woman presents with a 9-month history of fatigue, cold intolerance, poor concentration, and constipation. She is otherwise healthy, takes no medications, and does not smoke cigarettes. She has a blood pressure of 135/90, a pulse rate of 55 beats/min, and weighs 132 pounds (60 kg). She has a firm goiter, approximately twice the normal size. Serum TSH is 20 mU/L (normal 0.4-4.5 mU/L), and free T4 is 0.7 ng/dL (normal 0.8-1.8 ng/dL)
Variant 1: Persistent symptoms	1. 6 months later, the patient states that she felt better initially after starting thyroid hormone therapy, but now, her fatigue and poor concentration have returned. Her TSH is 0.5 mU/L and free T4 is 1.5 ng/dL (normal 0.8-1.8 ng/dL). What is your usual approach to this situation? 2. If you answered, "Test for other sources of her symptoms" in the preceding question, which of the following tests would you perform in this patient?
Variant 2: Pregnancy	The patient is a 25-year-old woman with recently diagnosed primary hypothyroidism who wishes to become pregnant. Past history is significant for one prior spontaneous miscarriage. She has a small firm goiter, a pulse rate of 55 beats/min, and normal deep tendon reflexes. At diagnosis 3 months earlier, she was placed on levothyroxine, and currently, the serum TSH is 3.5 mU/L (normal 0.4-4-5 mU/L). Thyroid peroxidase antibodies are strongly positive
Variant 3: Subclinical hypothyroidism	A 52-year-old woman with a family history of thyroid dysfunction is found to have a serum TSH of 7.8 mU/L. She is asymptomatic and otherwise healthy, takes no medications, and does not smoke cigarettes. She has a blood pressure of 125/80, a pulse rate of 75 beats/min, and weighs 132 pounds (60 kg). She has a firm goiter, approximately twice the normal size. Repeat serum TSH is 7.9 mU/L, and free T4 is in the midnormal range

Based on the 2013 international survey. TSH: Thyroid-stimulating hormone

formulations in MEA (71.6%) compared with Latin America (58.0%), Europe (58.8%), Asia-Oceania (58.2%), and North America (37.9%) [Figure 2].

Follow-up

Among 356 respondents, 34.6% would recheck thyroid hormone levels 6 weeks after starting thyroid hormone therapy, followed by 4 weeks (29.2%), 8 weeks (18.5%), 2 weeks (9.8%), and 12 weeks (5.9%). Specific testing at the time of follow-up included TSH for 340 of 348 (97.7%) respondents, free T4 (53.5%), free T3 (18.1%), or total T3 (4.9%).

Thyroid-stimulating hormone targets

Among respondents, the target TSH in the 52-year-old index case was 2.0–2.9 mU/L in 118 responses (34.5%), 1.0–1.9 mU/L for 55 respondents (15.9%), 3.0–3.9 mU/L in 90 respondents (26%), and 0.5–0.9 mU/L in 55 respondents (5.2%). When asked what the TSH target would be in a 25-year-old patient, there was a shift toward lower TSH values, with 38.3% now selecting 2.0–2.9 mU/L, followed by 1.0–1.9 mU/L (25.5%), 3.0–3.9 mU/L (14.9%), 0.5–0.9 mU/L (9.7%), and 4.0–4.9 mU/L (7.0%). Conversely, in an 85-year-old patient, 33.5% would select a TSH from 4.0–4.9 mU/L, followed by 3.0–3.9 mU/L by (25.0%), 2.0–2.9 mU/L, and 5.0–9.9 mU/L (12.8% each). A comparison of TSH targets for the three age variants is shown in Figure 3.

Therapy for overt hypothyroidism

Among 366 respondents, 350 (97.6%) would initiate thyroid hormone therapy in the index case of overt hypothyroidism compared to 98.9% in the international survey. We queried respondents about their usual technique for correcting overt hypothyroidism. Among 367 respondents to this question,

244 (66.5%) would gradually restore euthyroidism, 54 (14.7%) would select an empiric dose adjusted to achieve target levels, and 68 (18.5%) would start with a calculated full-replacement dose. A greater proportion of the Middle East-Africa (66.5%) respondents would use a gradual approach compared with Latin America (60.5%), Europe (55.8%), Asia-Oceania (55.1%), and North America (30.5%).^[13] For respondents preferring a gradual restoration of euthyroidism, most (56.6%) would increase in increments of 25 µg, followed by 50 µg (21.7%) and 12.5 µg (17.8%). The frequency of incremental increases was 6 weeks (34.6%) followed by 4 and 8 weeks by 29.2% and 18.2%, respectively. Long-term follow-up: After achieving stable target TSH values, respondents were asked how often they would repeat thyroid laboratory testing. Among 348

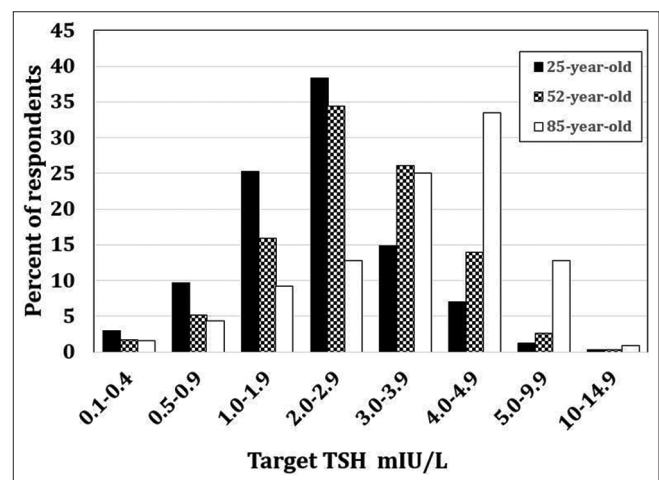


Figure 3: Age-specific thyroid-stimulating hormone targets among survey participants (upper) for 25 years old, 52 years old, and 85 years old

Table 2: The concordance of survey responses with select subset of the 2012 clinical practice guidelines recommendations in the international survey (American Thyroid Association/ES/American Association of Clinical Endocrinologists 2013)^a (American Thyroid Association 2013) and the present study (Middle East and Africa 2015)

Recommendation number	CPG recommendation (abbreviated)	Concordance (%)	
		ATA 2013	MEA 2015
R1	Measure TPO Ab in subclinical hypothyroidism	91.9	82.0
R8	Use both free T4 and TSH to monitor L-T4 treatment	59.9	49.7
R10	Do not use T3 to diagnose hypothyroidism	86.3	92.1
R13	Measure TSH 4-8 week after starting or adjusting L-T4	74.9	82.3
R14.1	Use age-specific normal ranges for TSH when available	84.2	71.4
R 14.2	Use pregnancy-specific normal ranges for TSH when available	96.1	74.0
R15	Treat patients with TSH above 10 mIU/L	98.9	95.6
R16	Consider other factors before treating patients with TSH 5-10 mU/L	78.7	91.0
R17	Target TSH should be within the normal range when treating hypothyroidism	99.5	95.4
R22.1	Use L-T4 alone to treat hypothyroidism	99.2	97.2
R22.2	Do not use L-T4 and L-T3 combinations to treat hypothyroidism	99.2	98.4
R22.4	Do not use desiccated thyroid hormone to treat hypothyroidism	100	99.0
R22.7.2	Gradually restore euthyroidism in patients older than 50-60 years of age	38.3	66.5
R25.3	Check thyroid laboratory studies every 4 weeks for the first half of pregnancy	70.6	62.9

^aReference 17, TSH: Thyroid-stimulating hormone, CPG: Clinical practice guideline, MEA: Middle East and Africa, ATA: American Thyroid Association, TPO: Thyroid peroxidase, Ab: Antibody

respondents, 47.4% would obtain laboratory studies at 6-month intervals, followed by 3 months (35.3%), 12 months (11.8%), and <3 months (5.2%). The manner in which asymptomatic patients at target TSH values would be followed was by laboratory studies plus office visits by 59.7% of 348 respondents, return to the primary care physician by 33.1%, or laboratory studies plus a phone call by 7.0% of respondents.

Variation 1: Persistent hypothyroid symptoms

When a patient despite achieving target TSH values on L-T4 therapy still has persistent hypothyroid symptoms, was presented to participants [Table 1], of 329 respondents, 86.9% would perform testing for other sources of the patient’s symptoms, 5.8% would add L-T3 therapy to L-T4, 4.6% would increase the dose of the patient’s L-T4 and 1.5% would refer the patient to behavioral health but only 1.2% would refer the patient back to their primary care physician for further evaluation. Additional testing requested in patients with persistent unexplained hypothyroid symptoms would include a complete cell count by 86.0% of 286 respondents, a complete metabolic panel (71%), morning cortisol level (67.5%), serum Vitamin B 12 levels (57.7%), or T3 levels (25.5%). In particular, measurement of 25-hydroxyvitamin D levels was suggested by 13 respondents only.

Variation 2: Hypothyroidism and pregnancy

Respondents were queried regarding their approach to a 25-year-old woman with Hashimoto’s thyroiditis, who is planning pregnancy and has a serum TSH of 3.5 mU/L on L-T4 therapy [Table 1]. For the prepregnant patient, the preferred TSH target for 316 respondents was 2.0–2.4 mU/L (28.5%), followed by 1.5–1.9 mU/L (15.8%), 0.5–0.9 mU/L (13.6%), 1.0–1.4 mU/L (13.0%), and 2.5–3.0 mU/L (7.9%). Respondents were next asked about immediate changes in L-T4 dose after a confirmed pregnancy in a woman with a recent TSH value of 0.5 mU/L [Figure 4]. Among 316 respondents, 52.2% would continue the current dose of L-T4, 23.7% would increase the dose by one-third, 14.9% would decrease the dose by

one-third, 4.8% would increase the dose by 50%, and 4.4% would decrease the dose by 50%. The preferred TSH range during pregnancy was similar to the prepregnant patient, with a TSH target of 2.0–2.4 mU/L among 25.4% of 315 respondents, 0.5–0.9 mU/L (16.2%), 1.5–1.9 mU/L (16.5%), 1.0–1.4 mU/L (11.8%), and 0.1–0.4 mU/L (3.2%). However, an unexpectedly large proportion (27.0%) preferred TSH >2.5 mU/L [Figure 4]. Among 318 respondents, 62.9% would check thyroid laboratory studies every 4 weeks during pregnancy, 17.6% every 8 weeks, 10.7% every 12 weeks, and 8.8% every 2 weeks.

Variation 3: Subclinical hypothyroidism

A case of subclinical hypothyroidism in an asymptomatic 52-year-old woman with a serum TSH of 7.7 mU/L was presented to participants [Table 1]. Among 306 respondents, 82.0% would perform TPO Ab testing, 60.8% would request a thyroid ultrasound, 58.2% would obtain a lipid panel, 43.8% would obtain antithyroglobulin Ab, and would order either a free T3 (38.9%) or total T3 levels (11.8%). Among 300 respondents, the percentage that would start L-T4 therapy for subclinical hypothyroidism in the presence of the listed clinical factors is shown in Figure 5. Most respondents indicated more than one potential indication for treatment. Treatment without additional justification was selected by 9.0% of respondents from the Middle East-Africa. This was lowest among previously reported response rates from Asia-Oceania (9.3%) and Latin America (10.8%) but less than responses from Europe (14.3%) and North America (24.7%).^[17]

DISCUSSION

The current report provides results of a survey of clinical practices in the management of primary hypothyroidism by 368 physicians practicing in the MEA region. A previous survey of the international members of American endocrine societies included a minority representation (48 responses) from this region.^[17] We have used an analogous survey instrument used in the international

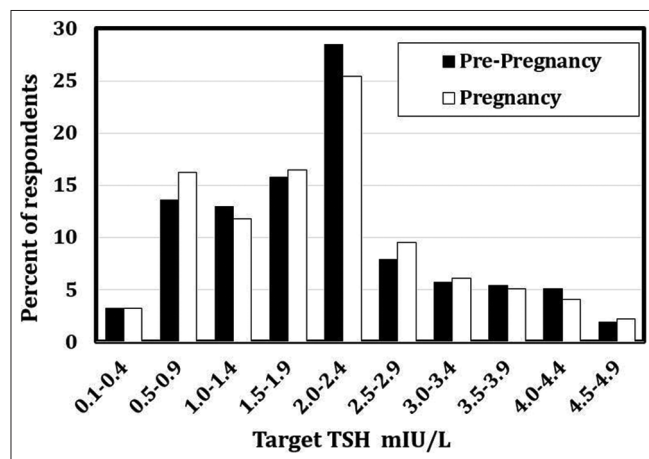


Figure 4: The widely distributed range of thyroid-stimulating hormone targets for pregnant and prepregnant patients. An unacceptable long tail of responses choosing target thyroid-stimulating hormone >2.5 mU/L

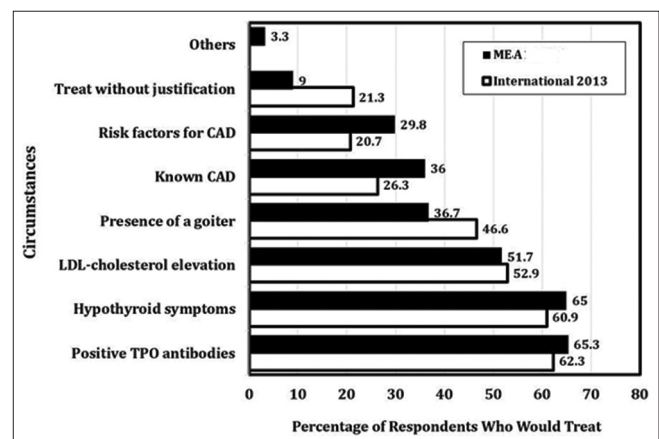


Figure 5: Percentage of participants who would initiate treatment of subclinical hypothyroidism in the presence of the listed circumstance in the Middle East and Africa regions (closed) and the international 2013 survey (open)

survey to allow making comparisons of the present data set with the previously published survey.^[17] This is part of a project aiming to document patterns of clinical practice in the management of common endocrine conditions in the MEA.^[20-26]

The salient findings are first nearly exclusive preference for L-T4 alone as initial therapy, in line with current practice, and second, a low threshold for treating mild thyroid failure in line with European and American recommendations. There is excessive use of US scanning in the MEA region (66.9%) compared to the international cohort (44.4%); it is likely unnecessary in most cases without a palpable goiter. This finding is similar to a recent survey from India.^[19]

More respondents from the MEA region opted that there is a highly variable approach to both the rate and means of restoring euthyroid status for overt disease. The careful cautious approach may be due to the influence of older teaching or a reflection on the patient population encountered in the practice with more advanced disease and comorbidities.^[27] Although 25 mcg tablets are available, clinicians have learned to escalate the dose in as low as 12.5 mcg doses because of the very long half-life of T4. The frequency of incremental increase of 6–8 weeks by more than 50% of respondents is in line with current guidelines. Long-term follow-up reflects practice appropriate for the region and 6 months is the usual interval. A combination of T3 and T4 is infrequently used. This could reflect the controversy surrounding this issue, level of knowledge or preference of convenience, or inconsistent access to T3 in general.^[28] However, the very low use of thyroid extracts most likely reflects nonavailability or general avoidance of porcine products (particularly when consumed orally) in Muslim-majority countries although the differences are not particularly remarkable between the regional and international data in this respect^[17] [Figure 1b].

In patients with persistent hypothyroid symptoms, most respondents would perform testing for other possible causes of patients' symptoms and only a small proportion would add L-T3 therapy to LT-4, consistent with the fact that only recently has the medical community agreed that may be helpful in a small proportion of such patients.^[28]

There is some inconsistent tendency toward age-specific TSH targets, and L-T4 adjustments made using 25 µg increments, to achieve a target TSH value of 1–2 mU/L in younger patients and 2–5 mU/L in an octogenarian.^[2,29]

Management of established hypothyroidism in the pregnant or pre-pregnant woman has been addressed in recent CPGs.^[30,31] There is general agreement that L-T4 requirements increase in most pregnant women, often by up to 50% above baseline requirements despite some variations.^[32,33] Furthermore, due to concerns regarding adverse neurodevelopmental consequences associated with maternal hypothyroidism during early pregnancy,^[34-36] lower TSH targets are recommended in this setting.

The TSH targets in pregnant and pre-pregnant women recommended by respondents are widely variable and truly

complacent [Figure 4], suggesting a lack of knowledge of nonobstetric physicians of the guidelines or no real actual involvement in the care of these women. The TSH targets for the first trimester are usually low, and the increase in dose is in anticipation of increased deiodinase activity and increased metabolic rate and cardiac output; this was not obvious from our data [Figure 4]. Despite the current recommendation to increase the dose of L-T4 by 2 pills per week at pregnancy confirmation in the hypothyroid patient,^[30-33] our patient with a TSH value of 0.5 mU/L at pregnancy diagnosis would be maintained on the same dose by more than half of respondents (52.2%).

Patients with subclinical hypothyroidism represent a subset in which treatment with thyroid hormone is controversial.^[7,37] Nonetheless, 9% of respondents would treat such a patient with thyroid hormone without further justification, although many more would like to have justifications to initiate treatment [Figure 5]. Overtreatment with thyroid hormone may result in indiscriminate treatment with thyroid hormones. It is a frequent finding in patients intended for replacement therapy. The resultant subclinical thyrotoxicosis has been linked to adverse consequences such as atrial fibrillation and osteoporosis.^[38] The survey questionnaire could not deduce the reasons behind treatment.

Our study has both strengths and limitations. The number of respondents from the MEA region is much higher than those included in the international survey^[17] making it more representative of the region. The electronic mail invitation to participate provided an opportunity for more than 4000 potential respondents to learn about the survey and respond honestly at their own time. However, limitations of the present study are convenience sampling, loose definition of the recipient population, and selection bias. Another limitation is the inhomogeneous representation of various countries with marked diversity in the availability of treatment options. Selection bias could result in respondents to the survey being more aware of CPGs and potentially more adherent to their recommendations, thus overestimating the quality of care provided. Finally, the international differences noted in management practices may be a reflection of resource availability rather than the knowledge and skills of the physicians.

CONCLUSIONS

The present survey of physicians on the management of primary hypothyroidism documented for the first time current practice patterns and demonstrates both alignment and focal deviation from current CPGs. It should help in directing focused educational activities in the region, providing a baseline for future monitoring of practices. Regular revisiting using the same, modified, or totally updated instrument is warranted.

Acknowledgment

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Authors contribution

SAB and IHS proposed the idea of the study. SAB adapted the survey and drafted the manuscript. All authors examined the results and reviewed the manuscript for intellectual content and style. They all approved the final manuscript.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

The study was approved by the Institutional Review Board of Sheikh Khalifa Medical City, Abu Dhabi, UAE. All participants provided electronic informed consent to participate before they could proceed to access the survey questions. All data were analyzed anonymously.

Data availability

Data will be available by reasonable requests to the corresponding author.

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