



# Mapping of Endocrinology Training, Certification, and Service Provision in Arab Countries: An Exploratory Survey

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## Abstract

**Background** Modern health care and education in Arab countries vary widely. Developing a common understanding of the region's endocrine training, certification, and service models is timely.

**Methods** We surveyed 63 physicians from 15 Arab countries using an online questionnaire of four domains. They were: (1) informed consent and professional profile; (2) the training, career development, and recognition as an endocrinologist; (3) provision of endocrine services; and (4) the issue of self-proclaimed and recognition of "diabetologists."

**Results** Most respondents were senior physicians (82.5%) and adult endocrinologists (53/63). Most respondents (86.7%) confirmed that endocrinology is recognized as a specialty, but only 10.0% stated that it is recognized in major teaching hospitals; 70% of respondents confirmed that a full training program for diabetes and endocrinology exists in their settings; 53.7% stated that postgraduate training in endocrinology requires 2 years with examinations. Half were satisfied, and 25.9% suggested that changes were needed. Regarding endocrine services, 94.8% of respondents reported that the endocrinology is a main service. Diabetes services are reportedly provided mostly by endocrinologists (64.3%). However, nonendocrinologists are involved in diabetes care to a lesser extent. Some specialist services such as lipid clinics, andrology, and reproductive endocrinology are mainly part of endocrinology by 77.2% of respondents and under other specialties by 22.8%. Job opportunities exist primarily in private practice (43.1%) and state hospitals (39.7%). Finally, respondents disagreed with nonendocrinologists' title of "consultant diabetologist" as it is harmful (37.3%) or can be confusing (32.2%) and 22.0% were neutral. Over half (56.7%) stated that academic training courses are welcome to enhance knowledge about diabetes care by primary care doctors but should not be the basis of granting a specialist status.

**Conclusions** This first look at the mapping of training, certification, and recognition of endocrinologists in Arab countries revealed a wide variation of training systems and care provision. There is a pressing need to address these discrepancies.

## Keywords

- ▶ endocrinology career
- ▶ curriculum
- ▶ fellowship
- ▶ subspecialty training
- ▶ diabetologists
- ▶ alternative medical providers
- ▶ health care delivery

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## Introduction

Endocrinology is the branch of medicine concerned with structural and functional disorders of the endocrine glands, hormone action, and the metabolic consequences thereof. The specialty of endocrinology comprises diabetes, metabolism, nutrition, andrology, reproductive and sexual medicine, bone and mineral disorders, and endocrine cancers.<sup>1</sup>

Endocrinologists also have a central role in coordinating the multidisciplinary teams involved in dealing with structural lesions of endocrine organs. Most endocrinologists also train in internal medicine. The ubiquity of endocrine systems modulating body tissues and organs makes an endocrinologist a “true general physician” and a dedicated specialist.<sup>2</sup>

The increasing expansion in the various components of the discipline of endocrinology led to contrasting demands between the need for specialization and keeping general skills. Furthermore, the growing prevalence of diabetes and the availability of pharmacological and technical tools for its management created the need for wider sharing of care load.<sup>3</sup> Endocrinology training, certification, and service provision have evolved in North America to meet patients' needs and academic demands. Most clinical endocrinology fellowships are for 2 to 3 years.<sup>4</sup> However, more subspecialty training is also available.<sup>5</sup>

The Arab world includes 22 countries and comprises 6% of the world population.<sup>6</sup> The health care systems, are widely different in different countries from those that continued unchanged from the pre-independence phases to completely novel systems. Regarding regional postgraduate training, the Arab Board of Medical Specialization was established under the Arab League in 1978. It started with 4 subspecialties and now has over 40 subspecialties. Endocrinology has yet to be recognized as a specialty when conducting this study.<sup>7</sup>

The limited role of noninvasive and invasive procedures in the specialty made “defining and/or fencing” the endocrinology's boundaries difficult. This may lead to a wide variation in determining the specialty's professional qualification requirement, essential for professional regulation and public confidence. Therefore, there is a timely need to map endocrinology training, certification, and service provision in Arab countries to enable the recognition of specialists in endocrinology.

## Materials and Methods

### Target Population

The study population was defined by convenience sampling. In the absence of a single regional endocrine society with a well-defined membership list that can represent a study population, the target population was selected from a list of electronic mail pooled from different Arab countries. Additional questions were added to the survey to help define the professional profiles of the respondents and their practices similar to previously published studies.<sup>6–9</sup>

### Survey Management

A web-based commercial survey management service (Survey Monkey, Palo Alto, CA, United States) was used. All participants received an initial e-mail that explained the rationale of the survey. Each message included an explanation of the rationale and method of participation and a unique e-mail-specific electronic link to the questionnaire. The responses were collected and stored electronically for an anonymous analysis.

### Survey Questionnaire

The survey was purposefully designed to map the endocrinology services and training in the Arab countries. The text of the questionnaire is presented fully in the **►Supplementary Material S1**. Thirty multiple-choice questions were constructed. There were four different domains. The first included informed consent and capture of the respondents' demographic and professional profile (10 questions). The second domain covered the training and recognition as an endocrinologist (11 questions). The third domain covered endocrinology services and career development (5 questions). The fourth domain addressed the topical issue of self-proclaimed and recognition of “diabetologists” and the role of qualifications granted by no-training academic courses in diabetes.

### Data Analysis

The Survey Monkey online software and Microsoft Excel Spreadsheet software were used for data analysis. No details of the nonresponders were collected country-wise or respondent-based analysis were used to interpret the results depending on the nature of the question.

## Results

### Respondents' Profiles

Of the 65 respondents, 63 provided almost full responses and were included in the analysis. The majority were from 15 different countries: Saudi Arabia (17), United Arab Emirates (9), Lebanon (5), Libya (5), Tunisia (4), Iraq (4), Egypt (3), Oman (3), Sudan (3), Morocco (2), Jordan (2), Kuwait (2), Bahrain (2), Syria (1), Qatar (1). Over half were from the Arabian Gulf (58.1%), and demographic and professional profiles are described in **►Table 1**. Most were senior physicians (82.5%), and the female-to-male ratio was 1.1. Most were adult endocrinologists (53/63), and 10 were pediatric endocrinologists. Most (43) were in the 40- to 59-year age group. Moreover, 38.1% had 21 to 30 years of experience. Respondents were mixed mainly between government/public, primarily private, and academia. Many respondents were involved in the decision-making processes, consultation, and think tanks concerning endocrinology training, services, and professionalism. Many were involved in service organization, education, training, and research (**►Table 1**).

### Training and Recognition as an Endocrinologist

Most respondents (86.7%) confirmed that endocrinology is recognized as a specialty, but only 10.0% stated that it is

**Table 1** Respondents' profiles

Question	Responses	Results
Region (N = 63)	Arabian Gulf Rest of the Middle East. North Africa	58.7% 15.9% 25.4%
Sex (N = 63)	Male Female	47.6% 52.4%
What is your professional status? (N = 63)	Adult endocrinologist Pediatric endocrinologist	85.7% 14.3%
Career stage? (N = 63)	Senior Middle grade	84.1% 15.9%
What is your age group? (N = 63)	30–39 y 40–49 y 50–59 y 60–69 y	14.3% 41.3% 27.0% 17.5%
Experience (in years since graduation), N = 63	<10 y 11–20 y 21–30 y >30 y	14.3% 30.2% 38.1% 17.5%
Type of your practice? (N = 62)	Mainly private Mainly government/public Academia All	25.8% 38.7% 12.9% 22.6%
Are you personally currently involved in decision-making processes, consultation, and think tank concerning training, services, and professionalism in endocrinology? (N = 62)	A. Service organization B. Education and research C. Profession and advocacy All of the above A and B B and C A and C None of the above	16.1% 4.8% 3.2% 27.4% 17.7% 6.5% 8.1% 8.1%

recognized in major teaching hospitals. When asked about the format of the postgraduate training in endocrinology, 70% of respondents confirmed that a full training program for diabetes and endocrinology exists, but 20% stated that there is no formal training (► **Table 2**).

For those with formal postgraduate training in endocrinology, the majority (53.7%) require 2 years to be recognized as an endocrinologist. Different training models are reported, including university- and national-based board models (► **Table 2**). The postgraduate training was mostly nearest to North American training (50%), followed by British training (19.6%) in style. Most respondents described having a formal, clearly defined curriculum in endocrinology training against which candidates are tested (81.7%) in formal examination (76.7%). When the respondents' satisfaction with the current setting, or whether the whole system of recognition, training curriculum, and evaluation should be changed, was explored, 50% were satisfied, and 25.9% suggested that a training curriculum is needed or needs change. Others had reservations about the training, recognition, or evaluation systems (► **Table 2**).

Three specific questions were asked about pediatric endocrinology, academic endocrinology, and professional (clinical and academic) designations in endocrinology (► **Table 2**). Over half of the respondents (54.5%) confirmed the existence

of formal training and certification in pediatric endocrinology. Endocrinology in clinical practice and academia is indicated in various combinations of generic and specific designations (► **Table 2**).

### Endocrinology Services and Career Development

The details of endocrine service provision and career development are described in ► **Table 3**. Regarding endocrine services, 94.8% of respondents reported that the endocrinology service is provided by a designated endocrinology outpatient clinic. Regarding diabetes services, it is provided mostly by endocrinologists (64.3%). However, nonendocrinologists are involved in diabetes care to a lesser extent (► **Fig. 1**). Furthermore, specialist endocrine services such as lipid clinics, andrology, and reproductive medicine are reported to be mainly part of endocrinology by 77.2% of respondents and under the service of other specialties by 22.8% of respondents (► **Table 3**).

Regarding job opportunities, permanent job positions after completing the specialty training exist mainly in private practice (43.1%) and state hospitals (39.7%) and less in universities (13.8%). Over three-quarters (75.9%) also suggested that after becoming an endocrinologist, a part-time job or temporary appointment for a given time exists in their country. The estimated distribution of endocrinologists is

**Table 2** Training and recognition as an endocrinologist!

Question	Possible responses	Results
Is endocrinology recognized as a main specialty in your country? (N = 60)	No, endocrinology is part of general internal medicine Yes, endocrinology is recognized as a specialty, as described Yes, endocrinology is recognized only in major teaching hospitals	3.3% 86.7% 10.0%
What is the format of the postgraduate training in endocrinology in your country? (N = 60)	There is no formal training, and doctors claim an endocrinologist status There needs to be formal training; we depend on doctors trained in endocrinology elsewhere There is a full training program for DM, endocrinology, and metabolism	10.0% 10.0% 70.0%
If you have a training program, how many years of postgraduate training in endocrinology are required to be recognized as an endocrinologist? (N = 54)	2 y 3 y 4 y	53.7% 18.5% 27.8%
What type of postgraduate training in endocrinology is required to be recognized as an endocrinologist? (N = 60)	Not applicable University-based master-doctorate Board training + examination in IM only Board training in endocrinology IM board + endocrine fellowship	8.3% 13.3% 1.7% 28.3% 48.3%
Which of the following systems is the postgraduate training system adopted in your country? (N = 56)	North American training British training European training (non-UK) Homegrown (hybrid system)	50.0% 19.6% 12.5% 17.9%
Is there a clearly defined curriculum in endocrinology postgraduate training against which candidates are tested? (N = 60)	Yes No	81.7% 18.3%
Examinations in endocrinology after training (N = 60)	Yes No	76.7% 23.3%
Training and accreditation: Are you satisfied with the current setting, or should the whole recognition system, training curriculum, and evaluation be changed? (N = 58)	I am satisfied. No changes are needed The whole structure needs to change A training curriculum is needed OR needs to change Recognizing endocrinologists as specialists is needed Only the evaluation system needs to change	50.0% 5.2% 25.9% 12.1% 6.9%
Pediatric endocrinology: Provide details regarding the curriculum and service in your country (N = 55)	No formal training and certification in pediatric endocrinology There is formal training and certification in pediatric endocrinology	45.5% 54.5%
Academic endocrinology: Are endocrinologists in academia appointed specifically in endocrinology OR generically in medicine/pediatrics? (N = 56)	Generic, e.g., Professor of Medicine OR Professor of Pediatrics Specific e.g., Professor of Clinical Endocrinology	42.9% 57.1%
Designations: Are any of the following titles formally recognized in your country (i.e., appears on the doctor's license to practice)? (N = 59)	Consultant endocrinologist Consultant in diabetes and endocrinology Consultant in diabetes, endocrinology, and metabolism Consultant in internal medicine, diabetes, and endocrinology	35.6% 20.3% 22.0% 22.0%

Abbreviations: DM, diabetes mellitus; FM, family medicine; IM, internal medicine.

mainly in private practice (37%), government hospitals (36%), and to a lesser extent in universities (17%) and other institutions (11%) (– **Table 3**).

### A Special Issue: “The Diabetologist”

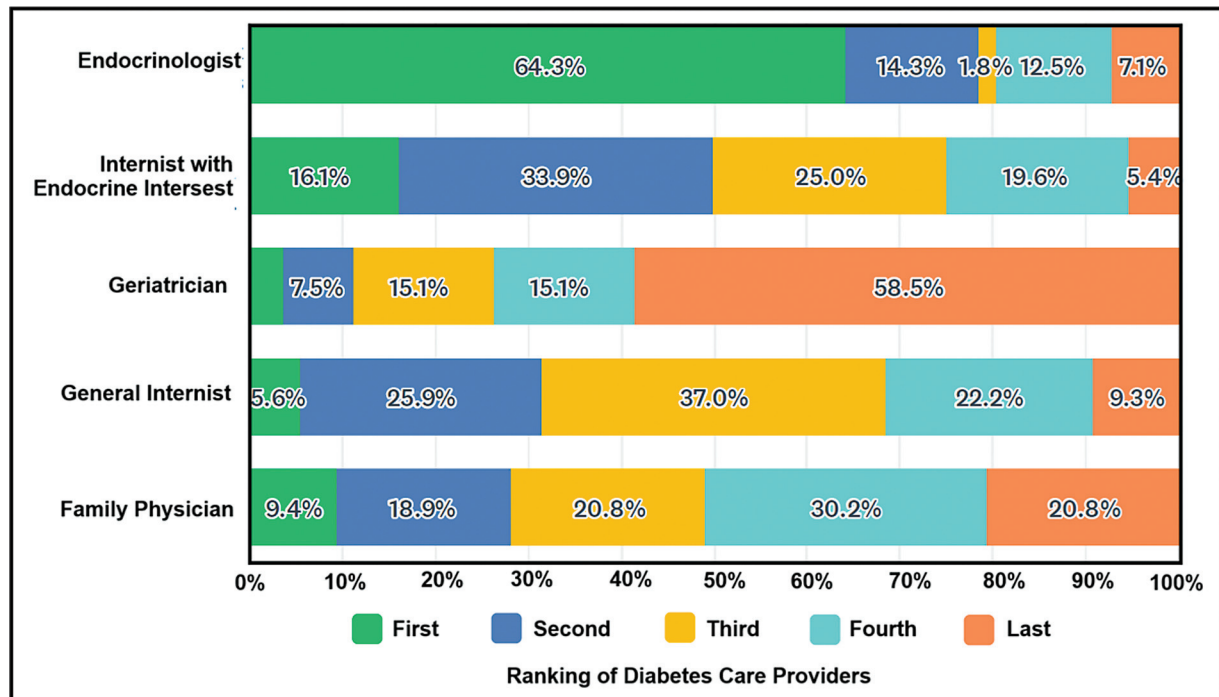
Considering the high prevalence of diabetes in the Arab countries, two specific questions were asked to address two contemporary concerns (– **Table 4**). First, regarding how strongly the respondents feel against or in favor about

the widely spread title “consultant diabetologist,” commonly used by internal medicine and family medicine doctors who are not formally trained in diabetes, endocrinology, and metabolism, 37.3% strongly disagreed, indicating that this title should not be used as it can be harmful and 32.2% stated the title should not be used as it can be confusing and 22.0% were neutral. A small minority accepted the practice. Second, several international and regional academic institutions conduct academic “teaching” courses in diabetes (granting

**Table 3** Endocrinology services and career development

Question	Predetermined responses	Results
<b>A. Service provision in endocrinology</b>		
Provision of endocrine care in an outpatient clinic? (N = 58)	Service exists in an endocrine outpatient clinic Service is provided under other specialties	94.8% 5.2%
Involvement of nonendocrinologists in diabetes care: Please provide details regarding the diabetes status of service in your country (% shown is for respondents ranking specialty as first choice). See ►Fig. 1	Endocrinologists Internists with endo interest Geriatricians General internists Family medicine	64.3% 16.1% 4.0% 5.6% 9.4%
Specialist services: lipids, andrology, and reproductive endocrinology (N = 57)	Part of endocrinology Under other specialties	77.2% 22.8%
<b>B: career development in endocrinology</b>		
Institution-wise job opportunity: What options exist for finding a permanent job after completing training (N = 58)	University State Hospital Private practice Family doctor Others	13.8% 39.7% 43.1% 1.7% 1.7%
Country-wise job opportunity: After completing the training, does a part-time job or temporary appointment for a given time exist in your country? (N = 58)	Yes No	75.9% 24.1%
Manpower distribution: Estimate the percentage of endocrinologists from the whole number of existing colleagues working under different types. (N = 48)	University Government Private Other	17% 36% 37% 11%
Arab Board of Medicine: Should the Arab board create a qualification in diabetes and endocrinology? (N = 57)	Yes No	87.7% 12.3%

Abbreviations: DM, diabetes; Endo, endocrinology.

**Fig. 1** Ranking of involvement of nonendocrinologists in diabetes care.

diploma or MSc degrees). Therefore, respondents were asked how they felt about the use of these degrees by internal medicine and family medicine doctors. Over half (56.7%)

stated that courses are welcome to enhance knowledge about diabetes care by primary care doctors (►Table 4). Finally, 87.7% of respondents confirmed that they think it is about

**Table 4** Special issues of “The diabetologist”

Special regional issues in designations in diabetes and endocrinology		
Question	Predetermined responses	Results
1. Designation as a “diabetologist”: How strongly do you feel against or in favor of the widely spread title “diabetologist” by nonendocrinologists? (N = 59)	I strongly disagree; they should not use it. It can be harmful	37.3%
	I disagree; they should not use it. It can be confusing	32.2%
	Neutral: I neither disagree nor agree	22.0%
	Agree; they can use it	5.1%
	Strongly agree; they can use it	3.4%
2. Diabetes degrees: Several institutions conduct academic “teaching” courses in diabetes (for a diploma or MSc). How do you feel about using these degrees by IM and FM doctors? (N = 60)	The courses are welcome to enhance knowledge about diabetes care	56.7%
	The courses do enhance knowledge about diabetes care through primary care	25.0%
	The courses do enhance knowledge about diabetes care through primary care	18.3%
3. Arab Board of Medicine: Should the Arab Board create a qualification in diabetes and endocrinology? (N = 57)	Yes	87.7%
	No	12.3%

Abbreviations: FM, family medicine; IM, internal medicine

time the Arab Board of Medical Specialization created a qualification in diabetes and endocrinology (–Table 4).

## Discussion

Mapping endocrine academic and clinical aspects in the Arab countries revealed several important observations: (1) endocrinology is recognized as a specialty and (2) full training programs for diabetes and endocrinology exist in most settings, with half satisfied with the current system; (3) diabetes services are reportedly provided mostly by endocrinologists; and (4) respondents disagreed with nonendocrinologists’ using the title of “consultant diabetologist”. However, academic diabetes courses may enhance knowledge about diabetes care by doctors but may not be the basis for granting a specialist status in diabetes.

A similar survey showed great differences in training, certification, and care provision across Europe, too. This was observed despite European training requirements in endocrinology at large. Duration varied from 2 years of common trunk internal medicine to 4 years of endocrinology. However, this is unique, as some countries may require longer internal medicine. The inclusion of research was also variable. There is still some striving toward harmonization across Europe.<sup>1</sup> Learning from these experiences can be valuable in Arab countries. However, differences across countries may prove difficult to eliminate between Arab countries as the region has no analogous European Union directives nor a clearly defined role for the professional societies.

Several changes in health care delivery, health legislation, and the physician workforce affect the supply and demand for endocrinology services. Hence, modeling and assessing the needs of the endocrinology workforce data to help project the supply and demand for endocrinologists is important.<sup>8,9</sup> Such exercises may reveal insufficient endocrinologists to satisfy the service demand, thus informing proactive strategies to mitigate this gap, including increasing

the number of endocrinologists in practice in the years ahead.<sup>8,9</sup> The present study did not intend to achieve this task but aimed to identify the various training and care provision models. Future studies need to be based on databases of registered physicians or membership of professional societies which should be developed further.

The delivery of specialist services may differ depending on doctors’ individual interests and previous training opportunities. Experiences elsewhere were limited to a few areas. De Ziegler et al highlighted the importance of standardized, quality training in reproductive endocrinology, infertility, and assisted reproductive technologies for endocrinologists.<sup>5</sup> The challenges stem from the high-tech nature of the work and country-to-country differences in clinical practice and regulations overseeing training and can not be extrapolated to general endocrine practice.

We did not ask about the driving factors to pursue an endocrinology training fellowship, and challenges and opportunities facing the next generation of endocrine researchers and clinicians, the lifeblood of endocrinology for the future. An online survey investigated the primary reasons endocrinology fellows/trainees are pursuing the field in the United States.<sup>10</sup> Most reported limited exposure to the field during medical school and that their endocrinology elective and mentorship experiences during residency were the most influential factors for pursuing endocrinology as a subspecialty. The authors suggested that improved integration of endocrinology experiences between medical school and residency may enhance career interest in endocrinology. Furthermore, a joint symposium by two different societies in Australia proposed a concerted effort to empower, train, and support the next generation of clinical endocrinologists and endocrine researchers is necessary to ensure the viability and vibrancy of our discipline and to optimize contributions to improving health outcomes.<sup>11</sup> Although the present survey did not ask specifically about research, incorporating research into clinical training needs to be more consistent. On the other hand, university-based research-

only degrees eg MSc and PhD's should not be claimed to be clinical degrees unless it incorporates a significant amount of supervised clinical training. Another study of 197 endocrinologists in Poland showed similarities to the current survey findings. Despite the heavy workload and average employment conditions, they reported a relatively high job satisfaction.<sup>12</sup> In our study, we only asked about satisfaction with the training programs. Kumar et al<sup>13</sup> suggested strategies to increase interest in subspecialty training in pediatric endocrinology.

The current diabetes epidemic may overwhelm the health care system unless we redesign how diabetes care is delivered. The number of endocrinologists is grossly inadequate to provide care for all individuals with diabetes. Malkani et al proposed a patient-centered, goal-based approach with resources devoted to care coordination, measurement of outcomes, appropriate use of technology, and patient satisfaction.<sup>3</sup> Also, Healy et al<sup>14</sup> sought the opinions of endocrinologists about diabetes care as it relates to the health care provider workforce. The majority of respondents agreed that there is a need for more providers to be trained to take care of patients with diabetes and that more trained providers are needed, and almost half agreed that primary care providers (PCPs) with advanced training in diabetes should be part of the workforce for managing the diabetes pandemic. Furthermore, Sadhu et al<sup>15</sup> described two successful diabetes fellowship programs that meet the need to create more expert diabetes clinicians and researchers outside traditional endocrinology fellowships. They appraised the structure of these programs, including funding and curriculum, as well as the outcomes for the graduates. They concluded that Diabetes fellowships aimed at primary care physicians are a successful strategy to train diabetes-focused physicians. Expansion of these programs may be encouraged and supported to grow the cadre of clinicians with expertise in diabetes care and improve patient access and outcomes. However, our respondents have reservations about claiming the diabetologist title by simply attending a teaching course without proper structured training. Their concern is justified as the problem can not be resolved by a quick fix. Short of properly structured, albeit, different training.

The expansion of diabetes care to primary care physicians is a major issue related to advanced diabetes technologies that have produced more favorable outcomes than older treatments. O'Donovan et al<sup>16</sup> assessed the willingness of PCPs to prescribe advanced diabetes technologies through a cross-sectional survey of PCPs from four geographically diverse centers. Also, Lal et al<sup>17</sup> performed surveys in the USA and found that PCPs fill insulin prescriptions but report low confidence in providing type 1 diabetes care and difficulty accessing specialty referrals to endocrinologists. Healy et al<sup>18</sup> evaluated family medicine residents' amount of exposure to diabetes in residency training, and reported confidence in diabetes management, and referral rates among this group being low. Also, comfort levels with treatment modalities beyond metformin and lifestyle changes needed strengthening.

Although this is the first exploration of the subject in the Arab region, representing 15 out of 22 countries with a fairly comprehensive questionnaire and lots of space to add additional comments, it has noteworthy limitations. First, the cross-sectional online survey method allowed only some differences to be elucidated. Second, although most respondents reported being involved in decision-making processes, these could have meant at a local rather than national or regional level. Third, there was inhomogeneous representation between countries, thus limiting the generalizability of the findings.

## Conclusion

This first look at the mapping of training, certification, and recognition of endocrinologists and endocrine care provision in the Arab countries revealed a wide variation of training systems and care provision. The demographic and epidemiological differences of the Arab populations may make translating concepts and practices from the West not readily applicable. Although, justifiable variations are not bad per se; the findings of the study underscore the pressing need for an immediate call for action at all levels to address these variations and harmonize or at least approximate the training and accreditation systems for physicians practicing in diabetes and endocrinology as needed by the regions' populations to optimize care provision strategies and build the public's confidence in the health care system within the specialty. Finally, a joint effort should be made jointly by academic institution, regulatory bodies and the profession represented by its endocrine societies in the region to help address the issue explored by survey more comprehensively.

### Compliance with Ethical Principles

The Institutional Review Board of Sheikh Khalifa Medical City, Abu Dhabi, UAE, approved the study. Informed consent was obtained from the participants before they took the survey.

### Funding

None.

### Conflict of Interest

None declared.

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