A Pilot Assessment of Primary Care Providers’ Knowledge of Adrenal Insufficiency Diagnosis and Management

Vinni Makin\(^1,2\), Amy S. Nowacki\(^1,2\), and Colleen Y. Colbert\(^1,2\)

Abstract

Background and Objectives: Adrenal insufficiency (AI) is one of the most challenging diagnoses in primary care, and misdiagnosis is costly. The aim of this educational needs assessment was to assess primary care physicians’ (PCPs) knowledge of AI diagnosis and management as a preliminary step in developing a professional education module to address knowledge of practice gaps. Methods: We developed a 12-item needs assessment and pretested questionnaire items prior to use to gather validity evidence. The questionnaire contained 4 AI knowledge items, 4 needs assessment items, and 4 demographic items. It was administered to 100 PCPs across a single integrated health care system over a 6-month period. Results: Fifty-one of 100 questionnaires were returned. The majority of respondents believed their knowledge of AI diagnosis and management was “average” when compared with peers. Responses indicated that PCPs were fairly comfortable diagnosing, but not managing AI patients. There was no association between respondents’ clinical knowledge of AI and respondents’ roles as clinical instructors (ie, having trainees assigned to them). A total of 54% of respondents said they utilized online resources to enhance current knowledge of AI and 88% of respondents said they would use a new AI resource, if available. When asked to rank preferences for professional development modalities, 26/38 respondents ranked UpToDate, 21/38 respondents ranked traditional lecture, and 19/38 respondents ranked case discussion among their top 3 choices. Conclusion: Results of this needs assessment showed that PCPs within our health care system both needed and desired professional development targeting AI diagnosis and management. A faculty development session, which included a short lecture and case scenarios, was developed and delivered to PCPs at participating family health centers. Session materials are now available for use by other institutions to meet professional development needs on this important topic.

Keywords

adrenal insufficiency, primary care, faculty development, professional development, survey

Introduction

An increasing number of inappropriate “adrenal fatigue” referrals to the endocrinology department at our institution prompted us to conduct a needs assessment for primary care physicians (PCPs) regarding the diagnosis and management of adrenal insufficiency (AI). Adrenal insufficiency is one of the most challenging medical disorders encountered in primary care.\(^1,2\) Patients with primary and/or secondary AI have an increased mortality risk, primarily due to cardiovascular and infectious diseases.\(^1-6\)

Systemic corticosteroids are a mainstay of treatment for many conditions, the foremost being primary and secondary AI, but also rheumatologic conditions, allergic reactions, hepatitis, restrictive lung diseases and inflammatory bowel diseases. According to data from the Healthcare Cost and Utilization Project (HCUP) in 2011, steroids accounted for 9.6% of all adverse drug events diagnosed on admission to the hospital.\(^2\) Diagnosis of AI is often delayed and expensive. None of the widely available tests—including the cosyntropin stimulation test (costing
$1,120), insulin tolerance test (costing $2,650) or the metyrapone test—classify all patients correctly. \cite{2,3} Thus, clinical judgment remains vitally important. Widespread use of steroids makes the diagnosis of AI even more difficult, and complicating all the above is the myth of “adrenal fatigue.” Therefore, it is important for PCPs to be properly trained regarding the diagnosis and management of AI, as they also act as educators for the next generation of healthcare providers, advocates for patient safety, and role models for correct healthcare utilization.

The purpose of this educational quality improvement project was to examine PCPs’ baseline knowledge regarding diagnosis and management of AI and assess needs and interests regarding professional development on this topic. In keeping with curriculum development and adult learning principles, we began by assessing the needs of our target group in order to develop effective professional development activities. \cite{3,4}

**Methods**

**Review of the Literature**

While the literature search highlighted needs assessments focusing on PCPs’ knowledge of diabetes in the field of endocrinology \cite{4,5} no articles could be found specific to AI diagnosis and management amongst PCPs.

**Questionnaire Development**

A 12-item needs assessment questionnaire was developed by the team. The questionnaire contained 4 best-answer AI knowledge items (scores of 0-4, where 4 was the highest score), 4 needs assessment items, and 4 demographic items. Content was reviewed by an expert panel (n = 8) comprised of endocrinologists and IM physicians, who provided feedback related to AI knowledge domains. \cite{6} To further refine the questionnaire, items were pretested with a representative sample of PCPs (n= 15) from our institution. Pretesting survey instruments during development is recommended by survey methodologists. \cite{7,8} During pretesting, participants completed the questionnaire and then used a survey evaluation tool to answer items related to question comprehensibility, ease of use, and whether any items were leading. \cite{9} Their feedback was used to revise questionnaire items prior to survey launch.

**Needs Assessment**

**Target Population.** The target population for this educational quality improvement project was all primary care physicians affiliated with our health care system.

**Sampling frame.** The sampling frame included PCPs who practiced at seven affiliated regional family health centers in Ohio during the project time period.

**Sample.** The sample was drawn from PCPs (N = 100) attending location-specific departmental staff meetings at 7 affiliated regional health centers in Ohio.

**Data Collection and Management.** The questionnaire (Table 1) was administered in paper format to groups of PCPs during quarterly or biannual staff meetings at regional family health centers from March through August 2015. Completed questionnaires were collected and data were managed using REDCap (Research Electronic Data Capture) electronic data capture tools.

**Data Analysis.** Characteristics of survey participants were summarized with counts and percentages. Associations among categorical variables (gender, grouped years of experience, working with a trainee) and AI items were assessed with Fisher’s exact tests. A significance level of 5% was adopted. The needs assessment project was submitted to the institution’s institutional review board for approval and was deemed to be a quality improvement/quality assurance (QI/QA) project.

**Results**

Of 100 questionnaires administered at regional family medicine centers, 51 were returned. The number of PCPs at these centers ranged from 11 to 20. Thirty respondents (59%) were men, and a third (17/51) had completed residency >20 years ago. Thirty-two PCPs (63%) responded that they had a trainee working with them on a regular basis (defined as ≥once per month) (Table 2). When asked to assess their own knowledge of AI diagnosis and management compared with other PCPs, 11 respondents (22%) selected below average, 39 (76%) selected average, 1 (2%) selected above average and 0 selected expert. Working with a trainee did not alter this self-assessment (P = .56).

Of 49 respondents who answered all 4 clinical questions, 1 (2%) scored 0, 16 (33%) scored 1, 15 (31%) scored 2, 15 (31%) scored 3 and only 2 (4%) scored 4 (highest score). Female physicians scored significantly higher on the clinical questions than men (P = .01), with 63% female versus 17% male scoring 3+. There was no association between AI score and years of clinical experience (P = .56). Working with a trainee was not associated with AI score (P = .60). The breakdown of select answers indicates that PCPs show a higher ability to correctly answer questions assessing
knowledge of AI diagnosis (Q8/Q9) as compared with knowledge of AI management (Q6/Q7, Table 1).

When asked about professional development, 40 respondents (88%) indicated they were interested in a new resource for diagnosis and management of AI if it were available. Fifty-three percent (27/51) of respondents noted that they currently utilize online resources for knowledge of AI, while 41% (21/51) reported receiving education from formal continuing medical education programs.

The last item on the questionnaire, designed to guide future program development, asked respondents to rank preferred educational modalities (Figure 1). Of 38 respondents who completed this question, more than half (n = 26) preferred UpToDate, with 9/26 ranking it as their first choice.
Twenty-one respondents ranked a traditional lecture within their top 3 choices, with 12/21 ranking it as their first choice. Nineteen respondents ranked an in-person, clinical case discussion among their top three choices, but only 7/19 ranked it as their first choice. The least popular educational modality was an online module available through our institution’s internal website.

Discussion

Results of our needs assessment indicated that PCPs’ knowledge of diagnosing AI was greater than their knowledge about management within our sample. The majority of survey respondents rated their own knowledge of AI diagnosis and management as “average” when compared with other PCPs. Interestingly, for some respondents, self-perceptions of their own knowledge changed after completing clinical questions. Some responses to the question, “How would you rate your knowledge of adrenal insufficiency diagnosis and management?” had been changed from “above average” to “average” or “below average” on paper questionnaires. Some PCPs also told the research team member on site that they realized they lacked knowledge of AI diagnosis and management after completing the questionnaire.

As one goal of this project was to use information gathered during the needs assessment to create a faculty development resource, we were surprised by respondents’ choices for professional development. Considering the ongoing shift in medical education across the country toward interactive learning, we expected respondents to endorse case-based discussions as a first choice for professional development.10 Instead, lectures and UpToDate were top choices. The choice of UpToDate may have been due to the substantial percentage of physicians who had been in practice for > 20 years.

Limitations

Needs assessments carried out for the purposes of program improvement, program evaluation, and curriculum development do not always meet criteria to be classified as research, as the primary focus of activities is on the identification of stakeholders’ interest/needs for planning purposes.2,11 This needs assessment project, designed as a first step in curricular module development, was not a research study and was not designed for hypothesis testing. While the survey response rate of 51% was not high, it was also not so low as to render our needs assessment results untrustworthy. Strengths include the rigorous questionnaire development methodology and the representative sample of respondents from our institution.

Development of Professional Development Session

Results of our needs assessment showed that PCPs within our health care system desired a professional development session targeting AI diagnosis and management. We determined that mixed methods of delivery may be most suitable. Based on these results, a professional development session which included both a lecture and a case scenario was developed and delivered at participating family health centers in the region. The educational module was then uploaded to ResearchGate.

Application to Other Settings

While this needs assessment project was focused on PCPs at our own institution, AI is one of the most challenging medical disorders encountered in primary care1,2 and gaps in AI knowledge and management exist across primary care settings. We believe the module developed to address knowledge and practice gaps on the part of PCPs (doi:10.13140/RG.2.2.32312.39689/2) will be useful to PCPs at other institutions across the country.

Conclusion

In this project, a needs assessment was conducted to identify gaps in PCPs’ knowledge of AI diagnosis and management. Results were then used to inform the creation of a professional development resource, which is available to PCPs outside our institution. As PCPs are typically the first line of contact for patients, and act as models for correct healthcare utilization and patient safety, they are critical stakeholders in AI management. We hope that dissemination of this
professional resource will help to improve patient safety and lower costs at our institution and others.

Authors’ Note
A part of this project was presented as a poster at the Endocrine Society National Meeting on April 2, 2017 in Orlando, FL.

Declaration of Conflicting Interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD
Vinni Makin https://orcid.org/0000-0003-1622-153X

References
1. Berghorsdottir R, Leonsson-Zachrisson M, Oden A, Johansson G. Premature mortality in patients with Addison’s disease: a population-based study. J Clin Endocrinol Metab. 2006;91:4849-4853.
2. Weiss AJ, Elixhauser A, Bae J, Encinosa W. Statistical Brief #158: Origin Of Adverse Drug Events in US Hospitals, 2011. Rockville, MD: Agency for Healthcare Research and Quality; 2013. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb158.pdf. Accessed June 20, 2019.

3. Cafferella RS. Planning Programs For Adult Learners: A Practical Guide For Educators, Trainers, And Staff Developers. San Francisco, CA: John Wiley & Sons, Inc; 2002.
4. Hertzman-Miller R, Beverly E, Goodrich A. An assessment of primary care providers educational needs regarding treatment for type 2 diabetes mellitus. J Cont Educ Health Prof. 2014;34(suppl 1):S32-S33.
5. Beaser RS, Neighbours JE, Brown J, Ronk KM, Wolnyiec WW. Usage patterns of devices designed to support diabetes management: an educational needs assessment. Endocr Pract. 2011;17:51-57.
6. American Educational Research Association, American Psychological Association, National Council on Measurement in Education. Standards for Educational And Psychological Testing. Washington, DC: American Educational Research Association; 2014.
7. Groves RM, Fowler FJ, Jr, Couper MP, Lepkowski JM, Singer E, Tourangeau R. Survey Methodology. 2nd ed. Hoboken, NJ: Wiley; 2009.
8. Presser S, Couper MP, Lessler JT, et al. Methods for testing and evaluating survey questions. Public Opin Quarterly. 2004;68:109-130.
9. Rogers G. Sample protocol for pilot testing survey items. http://www.abet.org/wp-content/uploads/2015/04/sample-protocol-pilot-testing-survey-items-1.pdf. Accessed March 15, 2018.
10. MacCarrick G. Curriculum reform: a narrated journey. Med Educ. 2009;43:979-988.
11. Cervero RM, Wilson AL. Negotiating the program’s needs-assessment. In: Working the Planning Table: Negotiating Democratically for Adult, Continuing, and Workplace Education. San Francisco, CA: Jossey-Bass; 2006:107-137.