Recommendations of Community Pharmacists and Health Food Store Employees Regarding Undiagnosed Symptoms of Diabetes

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BACKGROUND: Consumers may seek health advice from health food store employees (HFSEs) and pharmacists. Delays in the diagnosis of time-critical illnesses may increase the likelihood of morbidity, mortality and healthcare expenditures.

OBJECTIVE: To describe the information provided by HFSEs and pharmacists for symptoms of undiagnosed Type 1 diabetes.

DESIGN: A standardized actor portrayed a consumer with symptoms of Type 1 diabetes at eight community pharmacies and 12 health food stores (HFSs) in Pittsburgh, Pennsylvania, and Chapel Hill and Durham, North Carolina. He inquired about potential diagnoses, the need to see a physician, and product recommendations.

SUBJECTS: The subjects included twelve HFSEs and eight licensed pharmacists.

RESULTS: Four of eight (50%) pharmacists and two of 12 (17%) HFSEs mentioned diabetes as a potential diagnosis. Although six pharmacists recommended urgent physician follow-up, only two HFSEs did so; two HFSEs explicitly advised against a physician visit. One pharmacist recommended a product. Nine HFSEs recommended at least one product (monthly costs, range: \$24.70–\$209.96).

CONCLUSIONS: Even when presented with classic symptoms of Type 1 diabetes, under-recognition of diabetes was common among HFSEs and community pharmacists. Delays in treatment present a health risk to consumers. Further research could confirm these results and inform educational interventions to improve diabetes recognition by both groups.

KEY WORDS: diabetes mellitus; advice giving; complementary and alternative medicine; health food stores; pharmacists.

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previous year.¹ Common reasons for CAM use include disease prevention,^{1–3} chronic disease therapy (e.g., arthritis, cancer, depression),^{1–5} and treatment of symptoms,^{1–3} including those of diabetes mellitus.^{6,7} Among CAM modalities, dietary supplement use is most common, with 17.7% of American adults reporting using these products.¹ Sales of dietary supplements in the U.S. have grown from \$8.8 billion in 1994³ to \$14.8 billion in 2007.⁸

Consumers may seek information about CAM from various sources, including health food store employees (HFSEs).^{9–11} Given that HFSEs are not required to have formal training or be licensed^{9,11} their advice may be incomplete or inappropriate.^{9,10} Previous studies examining the advice provided by HFSEs to simulated shoppers with a “documented diagnosis” (e.g., breast cancer, HIV infection) found that their recommendations vastly diverged from standards of care. Their advice ranged from expensive and potentially contraindicated products^{10–12} to one HFSE who advocated discontinuing tamoxifen for breast cancer.¹⁰

Although prior studies examined the advice provided by HFSEs for specific diagnoses, people often use CAM to treat their symptoms.^{1,2,13} Thus, it is important to examine the advice provided to consumers who present to HFSEs with symptoms, particularly those associated with a serious illness. We conducted a pilot study to examine advice provided by HFSEs and community pharmacists to someone with symptoms of Type 1 diabetes. Diabetes is a prevalent condition with distinctive symptoms¹⁴ and can pose significant health risks if untreated, especially for Type 1 diabetes.^{15,16} We included community pharmacists because they often provide health advice to consumers,^{17,18} including CAM-related information.^{17,19} To our knowledge, no study examined pharmacists’ advice regarding undiagnosed Type 1 diabetes. We examined whether HFSEs and pharmacists: (1) recognized the symptoms of diabetes; and (2) recommended physician follow-up for these symptoms. In addition, we examined the monthly costs of recommended products.

INTRODUCTION

In 2007, approximately 38% of American adults reported using complementary and alternative medicine (CAM) during the

METHODS

The study protocol was approved by the University of North Carolina Institutional Review Board. Because informing subjects about the study would likely influence their behaviors and bias our results, we were permitted a waiver of informed consent. For this reason, we could not collect data on the subjects’ demographic characteristics, except for gender. Data were collected between December 2008 and March 2009.

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Study Sample

We used Internet phonebooks to identify HFSs and chain pharmacies in Chapel Hill and Durham, NC, and Pittsburgh, PA. We targeted chain pharmacies because, compared to independent pharmacies, they account for far greater retail sales and are more likely to have standard training protocols. We excluded HFSs that were ethnically-focused (e.g., Latino *tiendas*, Ayurveda) or affiliated with practitioners (e.g., acupuncturists, chiropractors). From this list, we selected a convenience sample of 12 HFSs (six affiliated with national chains, and six independent) and eight pharmacies from three national chains. One subject (HFSE or licensed pharmacist) was selected at each site. If two HFSEs/pharmacists were present, the actor interacted with the first individual who approached him. Student pharmacists and pharmacy technicians were excluded.

Procedures

To assess the subjects' actual behaviors, we used a standardized actor posing as a customer, a strategy that has been used successfully in previous studies of HFSs^{10,12} The actor was a 22-year-old, thin, Caucasian male who described an indolent onset of diabetes symptoms (malaise, fatigue, poor concentration, polyphagia, weight loss, polydipsia, and polyuria); the literature indicates that some adults who develop Type 1 diabetes have a prolonged onset of symptoms.²⁰ According to the script (Fig. 1), he recently moved to the area for graduate school and

lacked a primary care physician. For credibility, his symptoms were framed in terms of poor academic and social performance. He wore form-fitting clothing and carried a nearly-empty water bottle to each visit. He inquired about potential diagnoses for his condition, and asked for recommendations to alleviate his symptoms. If by the end of the interview, the subject had not voluntarily recommended a physician visit, the actor asked (i.e., "prompted") whether he should do so and over what time frame. The actor completed a data collection form immediately after the visit. Each visit lasted approximately 10–15 minutes.

We approached quality control in two ways. First, two academic internists reviewed our script for clinical plausibility. Second, issues that arose during data collection, coding, and analysis were discussed and resolved at weekly meetings.

Measures

We had three primary outcomes: (1) *Recognition of diabetes as a potential diagnosis (mentioned explicitly or as part of the differential diagnosis)*; (2) *Recommendation for physician follow-up*; and, (3) *Recommended products and their monthly costs*. All three authors independently coded the outcomes using the actor's field notes. Recommendations for physician follow-up were coded as three dichotomous variables: whether a recommendation was made; whether it was unprompted; and, urgency of follow-up (i.e., within 1 week). Recommended products were classified according to their primary ingredients. On rare occa-

For realism, the flow of conversation was allowed to vary naturally between individual visits, as appropriate; however, all seven symptoms of Type 1 diabetes were disclosed at every visit.

Figure 1. Type 1 diabetes mellitus script used by our standardized actor during site visits.

sions when there were disagreements, we resolved differences through discussion during weekly meetings. We also calculated the monthly product costs based on the minimum amount of product necessary for a single 30-day course, as recommended by the subject.

RESULTS

Recognition of Diabetes

Four of the eight (50%) pharmacists mentioned diabetes as a potential diagnosis (Table 1); pharmacist stated that diabetes was not a possible diagnosis. Other diagnoses mentioned by pharmacists included infectious mononucleosis and a malabsorptive disorder. In contrast, two of 12 (17%) HFSEs mentioned diabetes as a potential diagnosis. The remaining ten offered various diagnoses (e.g., “adrenal exhaustion,” anorexia, “mold infestation”).

Physician Follow-Up

All eight pharmacists recommended a physician visit, seven (88%) of whom did so without prompting. Six pharmacists recommended an urgent (i.e., < 1 week) visit. Of 12 HFSEs,

three (25%) made an unprompted recommendation for a physician visit, and three recommended a visit only after being prompted. Of the 6 HFSEs recommending a physician visit, two (33%) recommended an urgent visit. Interestingly, two HFSEs stated that a physician visit was unnecessary, and two others (both independent stores) explicitly advised against a physician visit. Their rationale was that the physician would likely overlook the underlying illness (“mold infestation” and “adrenal exhaustion”). One subject further cautioned that a physician would “just give [the actor] Ritalin” to curb fatigue.

Recommended Products

Only one pharmacist recommended a product—a multivitamin with a monthly cost of \$13.99. Conversely, all six independent and three of the six (50%) chain HFSEs recommended at least one product. Independent HFSEs often recommended herbal products, whereas chain-affiliated HFSEs frequently offered proprietary multivitamins. The most common ingredients (across all products) included *Rhodiola rosea*, Ashwagandha, Ginseng, and Guarana. Independent HFSEs recommended more products than those in chain HFSEs (mean: two versus one, respectively, data not shown). The total monthly costs for

Table 1. Results of Interactions with Pharmacists and Health Food Store Employees (HFSEs) by a Standardized Actor Describing Undiagnosed Type 1 Diabetes Symptoms

	Pharmacists (n=8)	HFSEs (n=12)
<i>Site characteristics</i>		
Chain-affiliated store	8	6
Female subjects	6	5
<i>Diagnoses</i>		
Diabetes recognition ^a		
Potential	4	2
Eliminated	1	0
Did not mention diabetes	3	10
Mean number of diagnoses offered	1	1.25
Alternate diagnoses offered (n)	Malabsorptive disorder (1) Mononucleosis (2)	Adrenal fatigue (3) Mental disorder (3) Toxin buildup (1) Electrolyte deprivation (1) Mold infestation (1) Kidney imbalance (1) Weakened immunity (1) Fibromyalgia (1) Anorexia (1)
<i>Physician recommendations</i>		
Suggested visit-unprompted	7 (6 urgent)	3 (2 urgent)
Suggested visit-prompted	1	3
Considered visit unnecessary	0	4
Missing ^b	-	2
<i>Product recommendations</i>		
Recommended at least 1 product	1	9
Mean recommendations (range)	0 (0-1)	1.3 (0-3)
Total monthly cost of products, range ^c	13.99	24.70-209.96
Product classifications (n) ^d	Vitamin/Mineral (1)	Herbal/Botanical (4) Amino acid/protein (2) Vitamin/Herbal (4) Vitamin/Mineral (3) Other (2)

^aThis variable was classified as “potential” if the diabetes was mentioned explicitly as a potential diagnosis or as part of the differential diagnosis. If the subject explicitly stated that diabetes was not a potential diagnosis, then this variable was classified as “eliminated”

^bTwo interviews were terminated before the actor was able to inquire about physician recommendations

^cMonthly cost of all products recommended at each site. Prices do not reflect discounts and do not include sales tax

^dProduct classifications generally follow the conventions described by the United States Pharmacopeia and the Dietary Supplement and Health Education Act of 1994

all products recommended by HFSEs ranged from \$24.70 to \$209.96, with recommendations from chain HFSEs being costlier than independent HFSEs (range: \$49.99–\$209.96 and \$24.70–\$73.44, respectively).

DISCUSSION

This pilot study is the first to report advice provided by HFSEs and community pharmacists to a standardized actor who portrayed undiagnosed Type 1 diabetes symptoms. We wish to highlight three findings. First, under-recognition of diabetes was common in both groups, even though a young, thin person described classic symptoms of Type 1 diabetes. Although pharmacists were more likely to consider diabetes as a potential diagnosis than HFSEs (50% vs. 17%), we were surprised that half of the pharmacists did not recognize this diagnosis in someone describing hallmark symptoms. Second, six of eight (75%) pharmacists and 2 of 12 (17%) HFSEs recommended that the actor see a physician within a week. Notably, 4 HFSEs told the actor that a physician visit was unnecessary; in two of these instances, the actor was explicitly discouraged from seeing a physician. Lastly, nine HFSEs recommended products that were often expensive. Failing to see a physician and using CAM could delay the diagnosis and appropriate management of Type 1 diabetes and lead to serious consequences.^{15,20}

Although our findings are novel, this study has several limitations. First, we used a single actor. Although he used a script to standardize the interactions, it is possible that pharmacists and HFSEs were influenced by characteristics of our actor. Second, we could neither audiotape discussions nor collect individual data on subjects without informed consent. This limited our ability to conduct additional analyses. Third, our study was small and limited in geographic scope, and independent pharmacies were excluded, which may limit the generalizability of our findings. Lastly, potential heterogeneity in advice received from different pharmacists and HFSEs is limited, as we interviewed only one subject per site.

CONCLUSIONS

We provide preliminary empirical evidence that advice provided by HFSEs and community pharmacists may be both inappropriate, and potentially harmful, to persons with potentially time-critical illnesses (e.g., Type 1 diabetes). Clinicians should be aware of the potential misinformation regarding symptom management being provided elsewhere. Future research should be performed to confirm our findings in a larger sample and determine whether the results generalize to other conditions. Such data could be used to develop strategies that help HFSEs and pharmacists recognize when a referral to a physician may be necessary.

Conflict of Interest: None disclosed.

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REFERENCES

1. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. Hyattsville: National Center for Health Statistics; 2008.
2. Eisenberg DM, Davis RB, Ettner SL, et al. Trends in alternative medicine use in the United States, 1990–1997: results of a follow-up national survey. *JAMA*. 1998;280:1569–75.
3. Blendon RJ, DesRoches CM, Benson JM, Brodie M, Altman DE. Americans' views on the use and regulation of dietary supplements. *Arch Intern Med*. 2001;161:805–10.
4. Cassileth BR, Lusk EJ, Guerry D, et al. Survival and quality of life among patients receiving unproven as compared with conventional cancer therapy. *N Engl J Med*. 1991;324:1180–5.
5. Rao JK, Mihaliak K, Kroenke K, Bradley J, Tierney WM, Weinberger M. Use of complementary therapies for arthritis among patients of rheumatologists. *Ann Intern Med*. 1999;131:409–16.
6. Bell RA, Suerken CK, Grzywacz JG, Lang W, Quandt SA, Arcury TA. Complementary and alternative medicine use among adults with diabetes in the United States. *Altern Ther Health Med*. 2006;12:16–22.
7. Yeh GY, Eisenberg DM, Davis RB, Phillips RS. Use of complementary and alternative medicine among persons with diabetes mellitus: results of a national survey. *Am J Public Health*. 2002;92:1648–52.
8. Nahin RL, Barnes PM, Stussman BJ, Bloom B. Costs of complementary and alternative medicine (CAM) and frequency of visits to CAM practitioners: United States, 2007. Hyattsville: National Center for Health Statistics; 2009.
9. Glisson JK, Rogers HE, Abourashed EA, Ogletree R, Hufford CD, Khan I. Clinic at the health food store? Employee recommendations and product analysis. *Pharmacotherapy*. 2003;23:64–72.
10. Mills E, Ernst E, Singh R, Ross C, Wilson K. Health food store recommendations: implications for breast cancer patients. *Breast Cancer Res*. 2003;5:R170–4.
11. Mills E, Singh R, Kawasaki M, et al. Emerging issues associated with HIV patients seeking advice from health food stores. *Can J Public Health*. 2003;94:363–6.
12. Gotay CC, Dumitriu D. Health food store recommendations for breast cancer patients. *Arch Fam Med*. 2000;9:692–9.
13. Eisenberg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med*. 1993;328:246–52.
14. National diabetes fact sheet: general information and national estimates on diabetes in the United States, 2007. Available from: http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2007.pdf. [Accessed March 8, 2010].
15. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2009;32 Suppl 1:S62–7.
16. Genuth S, Alberti KG, Bennett P, et al. Follow-up report on the diagnosis of diabetes mellitus. *Diabetes Care*. 2003;26:3160–7.
17. Robinson A, Cooper S. Trusted Information Sources: The Preferred Option for Complementary and Alternative Medicine Users. *Complement Health Pract Rev*. 2007;12:120–38.
18. Verhoef MJ, Trojan L, Armitage GD, Carlson L, Hilsden RJ. Complementary therapies for cancer patients: assessing information use and needs. *Chronic Dis Can*. 2009;29:80–8.
19. McHughes M, Timmermann BN. A review of the use of CAM therapy and the sources of accurate and reliable information. *J Manag Care Pharm*. 2005;11:695–703.
20. Eisenbarth GS. Type 1 diabetes mellitus. In: Kahn CR, Weir GC, King GL, Jacobson AM, Moses AC, Smith RJ, eds. *Joslin's Diabetes Mellitus*. Philadelphia: Lippincott Williams & Wilkins; 2005:399–424.