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RPG

In This Issue:

Feature Article:

Impact of "Evidence-Based Practice" Web-Based Modules on Perceptions, Attitudes and Knowledge of "Evidence-Based Practice" among Members of the Dietitians in Nutrition Support and Renal Dietitians Dietetic Practice Groups

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This article has been approved for 2 CPE units and the CPE insert can be accessed in the Members Only Section of the website from the CPE Inserts link.

Introduction

Evidence-based medicine (EBM) is "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (1). This approach to decision making integrates "the best research evidence with clinical expertise and patient values to answer a question about one's patient plan of care in order to optimize outcomes" (1). It is the ability to ask clinical questions, find the current best evidence, critically appraise the evidence and apply it to patients. It is essential to use the best research evidence in the care of patients to provide optimal treatment. EBM is also referred to as evidence-based practice (EBP) or evidence-based health care (EBHC). The concept of EBM is not limited to one health care profession, and may be applied to varied areas of dietetic practice.

The importance of EBM has become evident in the past few years in dietetics with the American Dietetic Association (ADA) promoting the development of evidence-based practice guidelines. The new ADA guides for clinical practice serve as benchmarks to evaluate the merit and efficiency of medical therapies by the government, private insurance companies and patients (2). ADA has appointed an Evidence-Based Practice Committee to oversee the development of these evidence-based guides for clinical practice and has introduced an online Evidence Analysis Library (3). Member training in evidence analysis and evidence-based grading is under the direction of ADA's Scientific Affairs and Research Team (3).

A criticism of the EBP guidelines, possibly from those who are uninformed, includes making diagnostic and therapeutic decisions based on medical literature while excluding the clinical knowledge and skill of the health care practitioner. Clinical practitioners are under increasing pressure to show that they are abreast of current knowledge and are providing services that are in line with recent clinical evidence (4). Another controversy is that EBP relies heavily on the meta-analysis of the results of randomized controlled trials (RCTs). The RCT is considered the "gold

standard" for evidence of effectiveness (4).

Byham-Gray reported the three most cited barriers by RDs in the US for applying research findings to dietetic practice included a lack of resources (time, money or staffing), poor organizational culture, and unsupportive health care team members (5). Other barriers to the adoption of EBP include attitudinal, perceptual and educational factors (6,7). Johnston et al. developed a self-administered questionnaire to assess EBP knowledge, attitude, behavior and perceptions in undergraduate medical students (7). Future use of EBP was positively correlated with the students' perceptions of themselves as EBP practitioners and the frequency of practicing EBP. Byham-Gray et al. report that the perceptions, attitudes and knowledge of EBP and level of education were identified as the strongest predictors of research score (6). Changes in attitudes, perceptions and knowledge are precursors to changes in behavior (7). Training RDs to apply EBP in their clinical decisions may increase use of EBP in the profession. Increasing knowledge and changing attitudes about EBP may lead to greater research involvement among RDs (6).

EBM is being promoted across the health care disciplines including dietetics. Clinicians must be able to locate, interpret and apply current best evidence to clinical situations. While previous research (5,8) has focused on the perceptions, attitudes and knowledge of RDs of EBP, there is a lack of published research demonstrating the effects of EBP training among RDs. This study explored the changes in EBP perceptions, attitudes and knowledge after completion of five web-based course modules and the relationship between these changes and their demographic characteristics among RDs who are U.S. members of the Dietitians in Nutrition Support (DNS) and/ or Renal Dietitians Dietetic Practice Groups (RPG) of the ADA.

Methods

Sample

The sample included RDs who were recruited from two dietetic practice groups (DPGs) of the American Dietetic Association (ADA): DNS and RPG. Members of the DPGs were invited to complete a questionnaire and five web-based course modules on EBP through an e-mail blast to its members through their listserv. Participants e-mailed the principal investigator (PI) requesting to participate in the research. Membership in the DPGs may overlap, however a system was established so no individual received more than one questionnaire. Each participant was assigned an online user identification to gain access to the questionnaire and web-based modules.

Study Design

The study employed prospective electronic pre- and post-web-based questionnaires used in conjunction with five web-based course modules. Participants accessed the questionnaires via a link using the URL for the Center for Continuing and Outreach Education (CCOE) of the University of Medicine and Dentistry New Jersey (UMDNJ). Participants received 15 hours of Continuing Professional Education units following completion of the five modules and post-questionnaire. Data was collected from September through October of 2006 using the *Dietetics Evidence-Based Practice Questionnaire.* This incorporated questions developed by Byham-Gray et al. (2005) entitled *Dietitian Research Involvement Survey* (5) which addresses perceptions, attitudes and knowledge of EBP among RDs. Questions regarding the demographic characteristics of the population were collected and included age, employment status, ethnicity, gender, level of education, primary area of employment, race, specialty certification, membership in DNS/ RPG (or both), and years of experience. The questionnaire incorporated a 5-point Likert scale to measure the perceptions and attitudes of participants (Table 2). Changes in perceptions, attitudes and knowledge were assessed through pre- and post- web-based questionnaires. The web-based modules were administered using WebCT, which is a distance education platform for learning.

Web-based Modules

Five web-based course modules on EBP developed by Byham-Gray et al. as part of a UMDNJ Academic Information Technology Advisory Committee (AcITAC) mini-grant (9) were used. The modules were interactive, and participants were able to advance at their own pace. The goal of the modules was to increase knowledge of EBP. Topics included learning how to formulate a searchable question, developing a search strategy,

Table 1
Response Rate by DPG

DPG (intial sample)	From Each DPG		From Total Sample (n=374)		Total Completing Study (n=155)	
	n	%	n	%	n	%
DNS (n=3399)	198	5.8%	198	52.9%	90	58.1%
RPG (n=2187)	132	6.0%	132	35.3%	46	29.7%
Both	36	0.6%	36	9.6%	16	10.3%
DPG not indicated	8		8	2.1%	3	1.9%
Total	**374**		**374**	**100%**	**155**	**100%**

critically appraising the literature, and applying the evidence to practice.

Results

Response Rate

Of the 5586 members of DNS and RPG, 18 % (n = 1006) responded to the e-mail blasts, and were useable responses. Forty-nine percent (n = 490 out of 1006) accessed the pre-web-based training questionnaire. Thirty-seven percent (n = 374 out of 1006) completed the pre-web-based training questionnaire, and forty-one percent (n = 155 out of 374) of participants who completed the pre-web-based training questionnaire completed the study. Response rates by DPG were as follows (Table 1):

The demographic characteristics of the study population were compared to the 1999 ADA Membership Database. Of the study sample, approximately 99% of participants (n = 370) were female and 1.1% (n = 4) were male. Slightly more than one third of participants represented the 46- to 55- year old age category (n = 136, 36.5%). The majority of participants were white (n = 340, 90.9%) and not Hispanic/Latino (n = 365, 97.9 %). The majority of participants represented the 46- to 55-year-old age group (36.5%) as compared to 25% in the ADA membership. Most participants had a higher level of education than the general population of ADA, with 46.0% having a master's degree compared to 41.3% in the ADA membership. In addition, the majority of participants worked in clinical-acute care facilities (64.7%) as compared to 34% in the ADA membership. The study sample was similar to ADA membership for race and ethnicity.

Prior to completing the EBP modules, participants received a perception/attitude score and a knowledge score. This was following the completion of a pre-web-based training questionnaire. A maximum perception/attitude score of 50 could be obtained. Participants' mean perception/attitude score was 39. 5 (SD = 4.8). Participants received a knowledge score which was based on the summation of 13 questions to assess awareness of EBP databases and terms in articles about EBP (relative risk, odds ratio, meta analysis, confidence interval, p-value significance). A maximum knowledge score of 60 could be obtained; the higher the score, the greater the knowledge regarding EBP. Participants' mean knowledge score was 29.4 (SD = 9.2).

After completing the EBP modules, the participants' mean perception/attitude score was 41.8 (SD = 3.9), with a range of 32 to 49. Participants' mean knowledge score post-web based training was 41.5 (SD = 6.5), with a range of 16 to 56.

Figure 1
Perception/attitude scores (n=155)

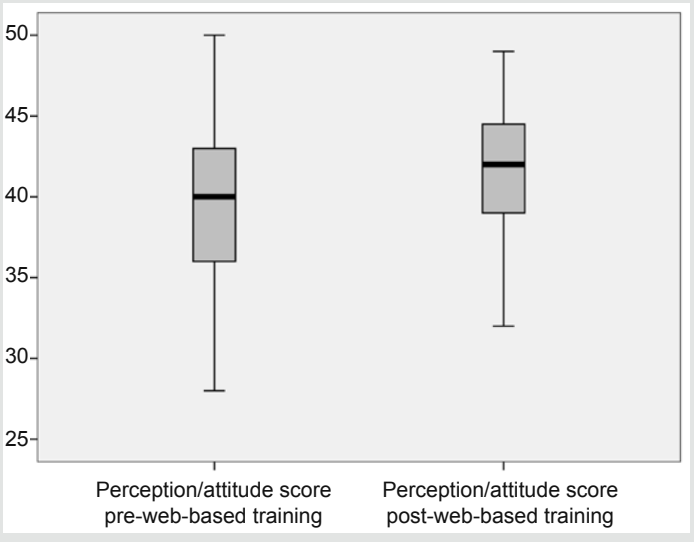


Table 2
Means, standard deviations (SDs) and significance analyzing the difference in perception/attitude scores after post-web-based training (n=155)

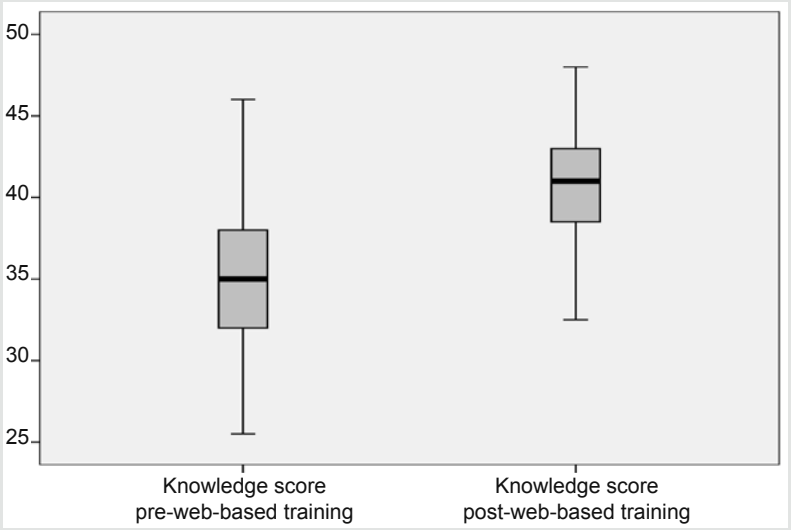
Statement	N	MS-pre†	SD	MS-post†	SD **	Paired t-test (t score)	p-value
Questions regarding perceptions of EBP							
There are many benefits to changing practice according to the latest research findings.	154*	4.3	0.7	4.5	0.7	-2.849	0.005
Evidence-based medicine is 'cook-book medicine' that disregards clinical expertise and patient's choice.	155	3.8	1.0	4.8	0.7	-10.968	<0.0005
Physicians and other health care professionals at my place of employment are supportive of implementing the latest research findings.	155	3.9	0.9	3.9	0.9	0.487	0.63
Research articles are not readily available at my place of employment.	155	3.5	1.4	3.7	1.3	-1.434	0.15
There is sufficient time on the job to implement new ideas.	155	2.9	1.2	3.0	1.2	-0.511	0.61
Questions regarding attitudes of EBP							
Practicing an evidence-based approach improves patient care.	155	4.3	0.7	4.7	0.5	-6.978	<0.0005
I am interested in using evidence-based practice in the care of patients.	155	4.6	0.6	4.8	0.4	-4.218	<0.0005
Research is relevant to my practice.	155	4.5	0.8	4.7	0.7	-3.723	<0.0005
I can use the results from published research in my job.	155	4.4	0.6	4.5	0.6	-1.981	0.05
I use evidence-based practice in the care of patients.	155	3.2	1.1	3.1	1.0	0.742	0.46

† MS-pre=Mean Score pre-web-based training; MS-post=Mean Score post-web-based training.
*One participant did not answer the question pre-web-based training.
**SD=Standard deviation

The changes in the participants' perception/attitude scores and knowledge scores were examined using paired t-tests. The mean perception/attitude score (± standard deviation) increased significantly (t = - 7.008, p < 0.0005) from pre-web-based training (39.5 ± 4.8) to post-web-based training (41.8 ± 3.9) with a mean change of 2.3 points (Figure 1). The greatest change in scores was for the statement: "Evidence-based medicine is 'cook-book medicine' that disregards clinical expertise and patients' choice." The number of participants who disagreed with this statement increased after web-based training (Table 2). This is in contrast to the study conducted by Johnston et al. who reported no significant change in attitudes towards EBP after EBP teaching in undergraduate medical students (7).

Questions that comprised the knowledge score were compared using paired t-tests (Table 3). The mean knowledge scores increased significantly (t = - 18.2, p < 0.0005) from pre-web-based training (29.4 ± 9.2) to post-web-based training (41.5 ± 6.5) (Figure 2).

Figure 2
Knowledge Scores



Scores reflective of participants' awareness of bibliographic databases (Table 3) increased significantly for the American College of Physicians Journal Club (t = - 9.404, p < 0.0005), ADA's Evidence Based Guides to Practice (t = -2.933, p = 0.004), Cochrane Database of Systematic Reviews (t = -11.005, p < 0.0005), and the ADA's Evidence Analysis Library (t = -5.944, p < 0.0005). There was no significant change in the pre/post assessment scores of Evidence-Based Medicine (t = 0.529, p = 0.598).

Paired t-tests were conducted to examine scores pertaining to statistical terms. There was a significant increase in participant's knowledge of 'relative risk' (t = - 9.107, p < 0.0005), 'odds ratio' (t = - 12.375, p < 0.005), 'meta analysis' (t = - 8.491, p < 0.0005), 'confidence interval' (t = - 8.327, p < 0.0005), and p-value significance (t = - 7.360, p < 0.0005) at the post-assessment.

There was no significant relationship between demographic characteristics and changes in

Figure 3
Level of education and change in knowledge scores

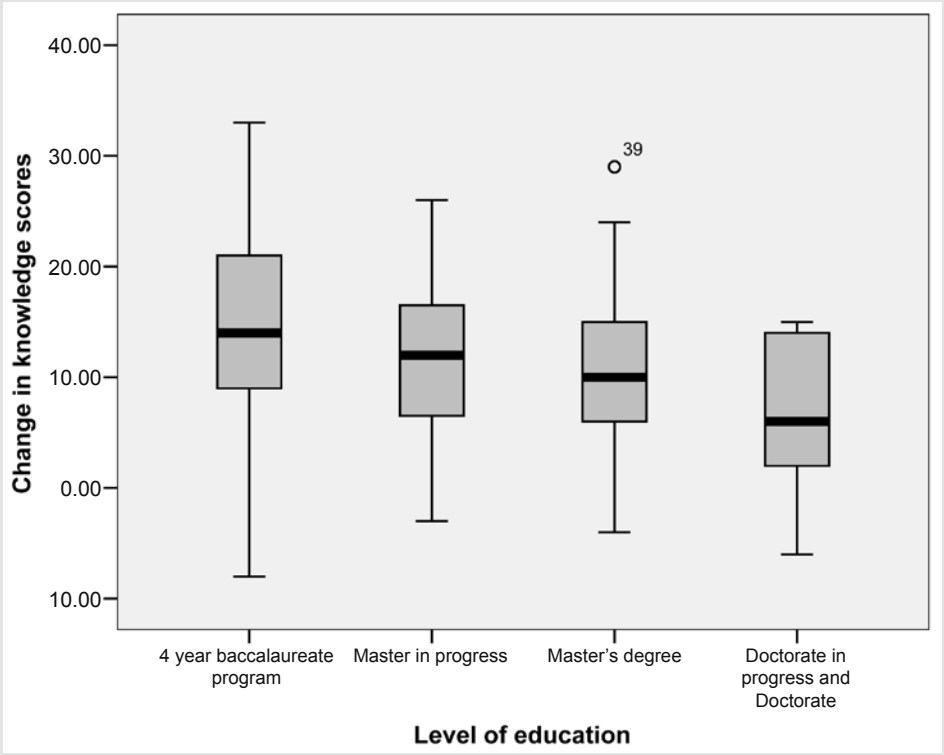


Table 3
Means, standard deviations (SDs) and significance analyzing the difference in knowledge scores after post-web-based training (n=155)

Statement	N	MS-pre†	SD	MS-post†	SD*	Paired t-test (t score)	p-value
Please check the item that indicates your awareness and use of Evidence-Based Medicine.	155	3.6	1.2	3.6	1.0	0.529	0.598
Please check the item that indicates your awareness and use of the American College of Physicians Journal Club.	155	1.2	0.6	1.9	0.7	-9.404	<0.0005
Please check the item that indicates your awareness and use of ADA's Evidence Based Guides to Practice.	155	3.1	1.3	3.4	1.1	-2.933	0.004
Please check the item that indicates your awareness and use of Cochrane Database of Systematic Reviews.	155	1.4	0.9	2.2	0.8	-11.005	<0.0005
Please check the item that indicates your awareness and use of ADA's Evidence Analysis Library.	155	2.5	1.3	3.0	1.1	-5.944	<0.0005
Please indicate your response to 'relative risk.'	155	2.3	0.8	2.9	0.8	-9.107	<0.0005
Please indicate your response to 'odds ratio.'	155	1.8	0.8	2.6	0.8	-12.375	<0.0005
Please indicate your response to 'meta analysis.'	155	2.3	0.9	2.9	0.9	-8.491	<0.0005
Please indicate your response to 'confidence interval.'	154**	2.0	0.9	2.6	0.9	-8.327	<0.0005
Please indicate your response to 'p-value significance.'	155	2.3	0.9	2.7	0.8	-7.360	<0.0005
Statement		**% Correct-pre†**		**% Correct-post†**			
What type of research is ranked the highest in the hierarchy of evidence?	155	65.2		91.0		-6.553	<0.0005
What is the first step in the evidence-based practice model for clinical decision making?	155	41.4		94.8		-11.292	<0.0005
The "PICO" technique to formulate a clinical question stands for:	155	29.0		88.4		-12.336	<0.0005

† MS-pre=Mean Score pre-web-based training; MS-post=Mean Score post-web-based training;
% Correct-pre=Percent Correct pre-web-based training; % Correct-post=Percent correct post-web-based training.
*SD=Standard deviation
**One participant did not answer the question pre-web-based training.

perception/attitude scores pre-and post-web-based training after conducting multiple one-way ANOVAs for ethnicity, level of education, primary area of employment, employment status and type of specialty certification.

There was a significant group effect for level of education ($F = 3.99$, $p = 0.01$) and change in knowledge scores (Figure 3). Post-hoc analysis using Tukey's Honestly Significant Difference (HSD) test, revealed a significant effect between a four year baccalaureate degree only and a Master's degree ($p = 0.02$).

Participants with a four year baccalaureate degree had a mean change in knowledge score of 13.95 (SD = 8.53), which was significantly greater than participants with a Master's degree (10.08 ± 6.66).

Participants who did not have a specialty certification had a significantly higher ($F = 5.54$, $p = 0.02$) mean change in knowledge of 12.51 (SD = 7.80) compared to participants who had a certification, 9.27 (SD = 7.54) . Post-hoc analysis using Tukey's HSD revealed a significant effect between participants with a specialty certification in "other" category versus those who did not hold a certification. ($p = 0.02$). Participants who did not have a certification had a significantly higher ($F=3.87$, $p= 0.02$) mean change in knowledge of 12.51 (SD = 7.80) than those who had a certification. There was a significant group effect for prior evidence analysis training and the change in the knowledge score pre-and post-web-based training ($F = 10.53$, $p = 0.001$). Participants who did not have prior evidence analysis training had a significant higher change in knowledge score of 12.24 (SD = 7.76) versus 5.53 (SD = 5.94) for those who did not.

Discussion

This study has examined the impact of EBP web-based modules on perceptions, attitudes and knowledge of EBP among members of DNS and RPG. Although previous studies have determined the perceptions, attitudes and knowledge of RDs in EBP (5), this is the first study to assess the impact of EBP education using distance education on RDs.

The majority of participants represented the 46 to 55-year-old age group (36.5%) as compared to 25 % in the ADA membership (10). This is similar to what was reported by Byham-Gray et al. (38.9%) (5). Closely related, Pravikoff et al. reported that the majority of nurses who responded to an EBP survey represented the 40 to 49-year-old age group who worked in a hospital (11). However, 5.9 % of participants represented the less than or equal to 25-year-old age group compared to 2.5 % in the ADA membership. This is in contrast to the results obtained by Byham-Gray et al. in which the response rate by younger RDs was less than the ADA membership (5). Most participants had a higher level of education than the general population of ADA with 46.0 % having a master's degree compared to 41.3 % in the ADA membership. The majority of participants worked in clinical-acute care facilities, as compared to 34% in the ADA membership (10). Byham-Gray et al. reported that 47.3 % of EBP study participants worked in acute care (5). The study sample was similar to the 1999 ADA membership for race and ethnicity. Approximately 6% of the membership of DNS and RPG participated in this study. Approximately one third of study participants held certifications as compared to the 2005 Compensation and Benefits Survey of the Dietetics Profession, which reported 17 % of RDs holding one or more specialty certifications (12).

Most participants agreed that practicing an evidence-based approach improves patient care, and the majority were interested in using EBP in the care of patients. Several studies have also reported that RDs recognize the value of research (5,6,8). However in the present study, only 34.5 % responded they used EBP in the care of their patients most of the time. Barriers included lack of time and availability of research articles at their place of employment. McKenna et al. identified that general practitioners believed barriers to using evidence-based practice were the limited relevance of research to practice, keeping up with all the current changes in primary care, and the ability to search for evidence-based information (13).

Evidence Based Medicine (14) was the most commonly used database among RD respondents to this questionnaire followed by ADA's *Evidence Based Guides to Practice* (3). Byham-Gray et al. reported that the ADA *Evidence-Based Guides to Practice* was rated the highest in terms of awareness and usage of bibliographic databases by RDs (5). Participants showed a low level of awareness of EBM databases. Most participants were unaware of the *American College of Physicians Journal Club* (15) and the *Cochrane Database of Systematic*

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Reviews (16). Similarly, Byham-Gray et al. report that 83 % of RDs were unaware of the *Cochrane Library* (5) and McColl et al. found that 60 % of general physician practitioners were unaware of the *Cochrane Database of Systematic Reviews* (17). Thomas et al. reported that among pediatric dietitians surveyed, most said they lacked the skills required for searching the literature (8). In addition, one of the findings was that most RDs were either unaware or aware, but did not use the *ADA's Evidence Analysis Library.* Only 5.3 % indicated that they used it regularly in practice. This is of concern since EBP has emerged as a major core competency for dietetic professionals (18).

Perception/attitude and knowledge scores changed after completion of the web-based training modules. After completing the five web-based course modules, the mean perception/attitude score for RDs increased. This is in contrast to the study conducted by Johnston et al., who reported no significant change in attitudes towards EBP after EBP teaching in undergraduate medical students (7). Scores did not increase for statements involving employment setting or time pressures. It appears the modules positively changed perceptions/attitudes that were perceived to be relevant and that participants felt they could control.

Knowledge scores also increased after web-based training. The results demonstrated that RDs were more aware of the *American College of Physicians Journal Club*, *ADA's Evidence Based Guides to Practice* and *Cochrane Database of Systematic Reviews*, and *ADA's Evidence Analysis Library* than pre-web-based training. Knowledge of statistical terms also increased. Ninety-one percent of RDs knew what type of research is ranked the highest in the hierarchy of evidence after web-based training as compared to 65.2 % prior to web-based training. Similarly, Gruppen et al. report that training students in EBM search strategies improved the quality of their searches (19). Johnston et al. report that post-assessment knowledge scores after EBP teaching improved in undergraduate medical students (7).

Demographic characteristics were not associated with changes in perception/attitude scores. However, the change in knowledge scores was related to level of education, specialty certification and evidence analysis training. RDs with a four year baccalaureate degree demonstrated the greatest positive change in knowledge score as compared to individuals with a master's degree. RDs that did not possess a specialty certification had a significantly greater change in knowledge scores than participants who did. In addition, although participants with prior evidence analysis training had higher knowledge scores pre-web-based training, knowledge scores after web-based training were not significantly different. In this case, it appears participants with the least amount of education and training had a greater change in knowledge scores which suggests that training RDs in EBP had a positive effect.

Strengths and Limitations of the Study

This study had several limitations. The questionnaires were not validated and did not take into account participants who did not work directly with patients. The study sample was restricted to two DPGs. In addition, it is possible that the participants who opted to participate felt the greatest need for improving their skills on EBP resulting in a possible response bias. However, the demographic characteristics of participants closely resembled the ADA membership. In addition, technical difficulties arose in accessing the URL for the Center for Continuing and Outreach Education of UMDNJ which may have contributed to the decrease in number of potential participants. Overall, the experience of study participants was positive based on comments: new awareness of databases, appreciation of the *ADA Evidence-Based-Library*, interesting content and learning approach.

Conclusions

This study explored the changes in EBP perceptions, attitudes and knowledge after completion of five web-based course modules. It also investigated the relationship between these changes and their demographic characteristics among RDs who are members of the DNS and RPG of the ADA in the United States. This study provides some encouraging evidence that perception/attitude and knowledge scores increased significantly in participants who had completed the web-based training modules. Susan Laramee, the 2005 ADA president, reported that, "State and federal government agencies, professional associations, purchasers of health care and regulatory organizations all increasingly demand that

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care delivery be based on EBP guidelines" (18). EBP may improve the quality of care and manage costs. ADA has recommended that all dietetic professionals engage in EBP, and that dietetics must truly become an EBP profession. Incorporating EBP in the nutrition care process provides the scientific strength behind our recommendations.

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