

Exploring the Use of Information Technology in Dietetics Practice among Clinical Dietitians^{*}

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ABSTRACT

This exploratory study investigated the software programs utilized by clinical dietitians and their perceptions on the use of information technology. The study focused on the use of specialized software for dietetics, general software for any office use and the Internet. A self-administered survey was used to collect data from clinical dietitians identified in the Kentucky Dietetic Association Directory 2003 – 2004. The survey was conducted in March through April, 2004. A total of 22 responses were collected, which yielded a response rate of 68%. Findings suggest that computer use has become a routine for optimal clinical practice ; major specialized software programs are used for nutrition assessment, nutrition analysis and menu development. Use of specialized software appears to be unassociated with dietitians' age and years of experience ; however, the associations are indicated between use of specialized software and education level as well as their specialty ; word processing and spreadsheet are the major general software used. Internet is used mainly for information search and communication. Respondents perceived that overall work efficiency and productivity significantly increased with computer use. The complexity of software is the major barrier encountered so training is the most needed support by the department. Strategic promotion on the use of specialized software should be targeted to the management team of the hospitals/facilities. (*J Community Nutrition* 7(3) : 149~155, 2005)

KEY WORDS: information technology · computer · dietetics · clinical dietitians · Kentucky.

Introduction

Information technology advancement has changed our major modes of communications. Use of emails, digital pagers, palm pilots, cellular phones, and teleconferencing is gradually replacing traditional telecommunications. The growth of the information superhighway has revolutionized the healthcare delivery system for both the healthcare providers and healthcare receivers(Bargh 2002 ; McMahon et al. 2003).

Computer technology has been utilized in the dietetics industry in performing many different functions, including nutrition screening, nutrition assessments, recipe analysis, menu planning, personalizing client educational materials,

and progress charting(Capra 2000 ; Evers, McKinney 2000 ; Grace-Fargaglia, Rosow 1995 ; Parks 1994). These applications greatly reduced the amount of time dietitians spend on calculations, documentation and recording. Microcomputers are widely available with an increasing number of software programs and the use of specialized software will become more popular and important among clinical dietitians(Hoffman 1991). Use of hand-held computers for nutrition evaluation by clinical dietitians had also been noted in the literature. One of the earliest reports of the application of hand-held computers to clinical nutrition appeared in 1978(Lozy 1978), however, the hand-held computer used at that time was actually a programmable calculator which was relatively bulky with limited portability. It was in 1994 when the use of lightweight, highly portable, pocket-sized, battery-operated calculators are initially reported. The calculators were pre-programmed with computational capabilities specially designed for nutrition assessment and support(Orta, Reinarts 1994). Smith(1999) discussed the six-point strategy selecting a hand-held computer for a clinical use. The series of research publications suggest the rising popularity of hand-held com-

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puters in the dietetics area.

Web site technology is another type of computer technology that deserves attention from dietetic professionals. At the present time, we are still in a hard-wired world, but the speed of the wiring is rising rapidly with the introduction of cable, Digital Subscriber Line(DSL), wireless broadband and satellites(Evers, McKinney 2000). Total connectivity will be the future scenario that allows for the dietetics professionals to disseminate nutrition information and services to thousands of consumers instantaneously(Coulston 1998). The use of the Internet ensures fast and quality healthcare service delivery to patients beyond geographic boundaries(Evers, McKinney 2000). Teleconferencing through the Internet is being developed so it is expected that the use of the technology will become increasingly popular in the near future. It is believed that teleconferencing would generate flexibility for both dietitians and patients in exchanging knowledge in nutrition and health regardless of the location and time (Capra 2000 ; Evers, McKinney 2000 ; Schiller, Wolf 2000).

A more recent study(Kirk et al. 2001) suggested that use of the Internet has become a valuable tool for health professionals seeking and communicating health, diet and nutritional information. Their study revealed that the Internet has an augmenting role in current services and dietitians have been using the Internet routinely in their work.

Facing the proliferation of computer technology, dietetic professionals must be computer-literate as well as be proficient with the Internet(Hayes 1999) as technology will be part of all we do and will alter the way in which we do it. To make technology work for us will be the challenge for the future(Chernoff 1994). Schiller and Wolf(2000) discussed professional development of a dietitian in preparing for practice in the 21st Century. The authors urged dietetic practitioners to keep pace with continuing technological advancements by managing information, revising processes in current modes of communication and healthcare delivery services. They also demonstrated the need of having programmers and engineers to design systems that would enhance food and nutrition management and would integrate nutritional services with other aspects of the health care system.

A number of previous studies have speculated a future scenario for the use of computer technology in dietetics industry. Computer skills are expected to be one of the major assets for dietitians to possess and are believed to be continually launching major impacts on the healthcare delivery

service. However, no previous study has been devoted to the examination of the use of computer technology among clinical dietitians in the state of Kentucky. The purpose of the present study was to explore the use of computer technology among clinical dietitians in Kentucky. The study holds two objectives to fulfill the research purpose. The first objective is to examine clinical dietitians' use of computer technology on the specific software, general software, and the Internet. The second objective is to identify clinical dietitians' perceptions about the effects of the computer technology on the clinical dietetics practice, the departmental supports, and the major barriers or challenges encountered in their workplaces. We focused on the clinical dietitians because they were identified to be the group relatively low in computer technology usage compared with foodservice and community dietitians. As we investigated how computer technology is used by clinical dietitians in this specific location, we focused only on the use of specialized software, general software, the Internet. Other applications of medical technologies were excluded including computerized biomedical electronic equipment.

Methods

1. Sample

A Directory of the Bluegrass District of the Kentucky Dietetic Association(KDA) 2003 - 2004 was used to identify the potential interviewees for the study. There was a total of 1,140 members in KDA 2003 - 2004, among them, 35 identified their specialty as clinical dietetics, for instance, renal dietitians. Only clinical dietitians or a related specialty were contacted and interviewed.

2. Research instrument

No previous literature has been identified with a survey on this issue. Therefore we developed and tested a survey instrument for this study. The survey is comprised of six parts : Part1 is on the use of specialized software in clinical dietetics practice ; Part 2 is about the use of general software ; Part 3 is about the use of the Internet ; Part 4 is about their perceptions about the effects of computer technology in clinical dietetics practice ; Part 5 is about dietitians' perceptions of their departmental support on the use of computer technology ; Part 6 is about their perceptions on the barriers and challenges encountered with the computer use. A brief introduction explaining the purpose of the study was also included

in the survey.

A pre-test was conducted with a focus group consisting of the faculty members in the Department of Nutrition and Food Science, School of Human Environmental Sciences, College of Agriculture at the University of Kentucky. All the participants in the focus group are licensed registered dietitians (RDs) in Bluegrass Dietetic District. A total of 5 faculty members were included in the pre-test wherein they were asked to identify the appropriateness of format, the language used on the survey as well as completing the survey. Amendments were made based on the inputs from the pre-test.

3. Data collection : survey distribution and interview process

The data collection was conducted in March through April, 2004. The survey was sent via email with an attachment to all clinical dietitians identified from the KDA Directory. They were requested to finish the survey and return to the sender through email. A follow-up phone call was made to those persons emailed with the survey if no response was received in a 7-day period.

4. Response rate

No email response was received in the 7-day period after the first sending of the survey. Phone call interviews were conducted to collect information for the survey. Attempts were first directed to the office phone numbers during the office hour from 9am to 5pm, Monday to Friday. If dietitians could not be reached within the first-week trial, another series of attempts were directed to their home phone numbers. With these efforts, all 35 identified dietitians were contacted : four of the contact numbers in the Directory were incorrect ; two dietitians rejected the request to participate in this survey. A total of 22 clinical dietitians completed the survey, which yielded a response rate of 68%.

5. Data analysis

SPSS 12 for Windows was used for the analysis of the collected data. Descriptive statistics that included frequencies and percentages were computed. Scattergrams were plotted to explore the associations between variables.

Results and Discussion

1. Demographic information of the respondents

All dietitians who participated in the study were female ;

majority (36.4%) of them were aged between 51 - 60 ; 63.6% were general clinical dietitians carrying no specialties at hospitals/facilities ; specialties carried by other dietitians in this study included nephrology(renal), cardiology, pediatric endocrinology, gerontology, and weight loss. Average years of experience as a Registered Dietitian(RD) was 17.3 ; half (50%) of the dietitians had received a Bachelor Degree (BSc) ; nine received Master Degree(MSc) ; only 2 received Doctorate degree.

2. Dietitians' having computers in their clinical practices

All dietitians use computers to a certain extent at work. Seventy-seven percent (77.3%) of them reported having their own computer at the workplace; the other 22.7% indicated that they were sharing a computer with colleagues at work. Only 9.1% of the dietitians reported using personal hand-held electronic devices at work.

Use of Specialized nutritional software at work

A total of 72.7% dietitians reported using some kind of specialized dietary/nutrition software on a regular basis. The most widely used nutrition-related software among clinical dietitians was nutrition assessment and computer-based patient records. Distribution of the use of different specialized software is illustrated in Fig. 1. Other specialized software programs reported by the dietitians included Dialysis Lab, Geri-Menu System and VA National System. Some dietitians who carried more than one title in hospitals/facilities, such as Clinical Manager/Food Service, reported using management

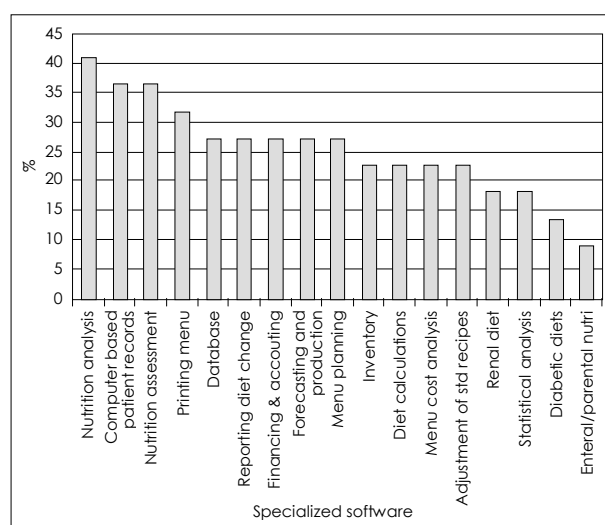


Fig. 1. Distribution of the use of specialized dietary/nutrition software programs in clinical dietetics practices.

software for skill assessment and training of the employees.

Only 31.8% of the dietitians indicated their departments planned to purchase or incorporate additional software at the workplace in the future. The other 68.2% reported having no idea about the future actions of the department on the addition or update of computer technologies.

3. Use of general software

The use of general software to improve productivity is examined. All (100%) dietitians reported using word processing on a regular basis. Other major productivity software used by clinical dietitians on a regular basis included spreadsheet (59.1%), PowerPoint presentation (54.5%), and database management (31.8%).

Only 22.7% of the clinical dietitians used word processing other than just typing and saving documents ; however, 86.4% of them indicated knowing the additional functions word processing can perform, such as producing multi-section documents, brochures, educational materials, and Web pages. This finding is consistent with the previous study by Evers and McKinney (2000), which reported that many registered dietitians used their computer merely as a typewriter with only minor increase in formatting of text.

About sixty (63.6%) percent of the clinical dietitians used spreadsheet software at work while 27.3% of them used spreadsheet for nutrient intake record; another 27.3% for weight, height, and skin-fold measurement documentation, 22.7% used it for lab data documentation. Spreadsheet software has also been found to serve a variety of functions which include aggregation and tracking of productivity data, preparation of Continue Quality Improvement (CQI) report, Performance Improvement (PI) report, educational materials, foodservice accounting, stocking, inventory, menu analysis/costing, expenses and contribution tracking and preparation of time sheets. A previous study (Evers, McKinney 2000) stated that many registered dietitians thought of the spreadsheet as an important tool for the management side of the house but not important for clinical and community dietitians. Quite the contrary to the notion, our study shows that a relatively high percentage of clinical dietitians used spreadsheets for a variety of different functions. They used it in clinical settings or for other managerial purposes. Most of the dietitians found the use of spreadsheet software advantageous.

Major advantages of spreadsheets identified were “easy to retrieve numerical information” (59.1%), “able to present

information in graphs” (54.5%), “able to perform calculations” (50%), and “able to perform statistical analysis” (45.5%). About thirteen percent of the clinical dietitians indicated that the format of the spreadsheet was another advantage of using it.

4. Use of the internet

A majority (81.8%) of the clinical dietitians reported using the Internet at work. Major functions of the Internet in clinical setting included information search (81.8%) and email communication (63.6%). Only 18.2% of the clinical dietitians used the Internet for teleconferencing. No other Internet use was reported.

The use of the Internet was considered very important in the clinical dietetics field as it received a mean score at 4.27 out of a 5-point scale (s.d. = 1.28) where 5 being extremely important. The use of teleconferencing as a patient-dietitian interaction media was perceived to be moderately popular and successful in the future. It had an average score of 3.59 out of the same 5-point scale system (s.d. = 1.10).

5. Clinical dietitian's perceptions of the overall effects of computer technology use on the clinical dietetics practice

Changes observed or experienced with the use of computer technology in the clinical setting were examined and illustrated in Fig. 2. Better time management (95.5%) and more systematic procedure were the two most critical changes accompanied by the use of computers, and other changes reported include better decision making (81.8%), better patient monitoring/tracking (81.8%), better communication (81.8%), better cost control (77.3%), reduced errors (72.7%), improved patient satisfaction (63.6%), and increased variety of nourishments (50%).

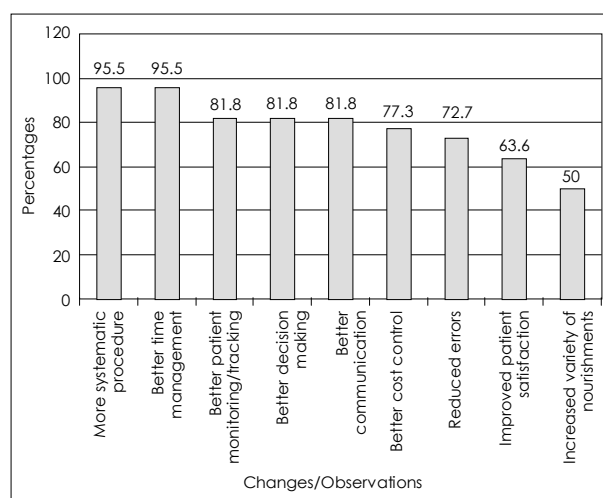


Fig. 2. Observed changes by clinical dietitians with the use of computer technology in clinical settings.

ient monitoring and tracking(81.8%), better communications (81.8%), better cost control and management(77.3%), reduction in errors(72.7%), improved patient satisfactions(63.6%), and increased variety of nourishments(50%). Some negative effects were also reported such as frustrations due to system failures, inflexibility of the commercial programs, and limitation of the variety of foods/nourishments in available databases.

In general, dietitians agreed that the use of computer technology helped enhance the overall efficiency and productivity of clinical practice. It received a mean score at 4.36(s.d. = 0.85) out of a 5-point scale system.

Perceptions of the departmental supports on the use of computer technology

Most of the clinical dietitians(95.5%) reported having received departmental supports on the use of computer technology. The most common type of support was training (90.9%). Centralized software installation in department computers was also common(81.8%). Other supports received by the dietitians included computer courses(72.7%) and general advertisements and encouragement on the use of computer technology(50%). Only 27.3% of the dietitians indicated being reimbursed by the department on the purchase of nutrition-related software for work. Some dietitians reported that they also received technical supports from the computer department.

6. Perceived Barriers and challenges in the use of computer technology in dietetics practices

Major barriers and challenges were examined in the clinical

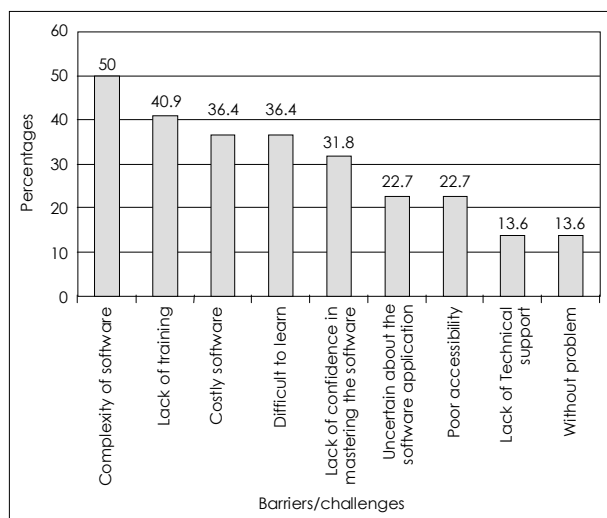


Fig. 3. Major barriers and challenges perceived by clinical dietitians on the use of computer technology in the clinical settings.

nutrition practices and illustrated in Fig. 3. Only 13.6% of the dietitians reported never encountering a problem with computer use. The complexity of software was the major barrier, followed by lack of training experience(40.9%). A significant number of dietitians found it difficult to learn the software(36.4%). Pricy software(36.4%) was also a barrier for incorporating software into regular use. Other barriers included lack of confidence in the available software(31.8%), poor accessibility(22.7%), uncertainty about the accuracy of the software(22.7%), and lack of technical support(13.6%).

7. Associations between variables of concern : demographic variables and the use of specialized software

Among the interviewed dietitians who reported having used specialized software at work, the mean of years of experience as a registered dietitian was 18.1 years(range : 3 - 33) while those who reported not using any specialized software at work had a mean of 15.5 years of experience(range : 3 - 35). It appears that the more experienced dietitians have a higher tendency to incorporate specialized software into their daily work.

The education level of the dietitians seemed to have an influencing effect on the use of specialized software as well. Among those dietitians who received a BSc degree, MSc degree, and PhD degree, 58.3%, 77.8%, and 100% reported using specialized software at work, respectively. It appears that the higher the education level, the higher the tendency for a clinical dietitian to use some kind of specialized software at work. However, it is worth noting that bias may exist in this casual conclusion because of the uneven distribution of the subjects' education levels.

As for the dietitians who indicated carrying a specialty in hospital/facility, 62.5% reported using specialized software at work, while 60% reported not using any specialized software at all. Because of the proximity of the percentages, it appears that the use of specialized software is not specifically associated with having a specialty in a hospital or other facility. The results in this sample show that all the dietitians have a certain amount of access to specialized software at work.

The use of specialized software appears to be independent of the age of dietitians. Modes for both "used specialized software" and "did not use specialized software" groups occurred at the age-range between 51 and 60, which suggests that the use of specialized software is not associated with age.

Summary and Conclusion

This exploratory research was aimed at obtaining information on the use of computer technology in clinical nutrition setting. The authors focused on the use of specialized software, general software, and the use of the Internet. Although it was only a small number in the sample size, a representative sample of members throughout the state was included in the survey and the response rate of 68% was good. The study was valuable in initiating the sort of continuing research a state can conduct to determine the future needs in clinical nutrition practice and reveal important aspects of computer technology use. Dietetic educators need data about computer use to incorporate experiences for entry level practitioners to master the skills needed for future clinical practice. With the small sample size, the interpretation of the results may not be generalized to all the clinical nutrition population particularly those who were not members of the professional association. In this sense, the study would serve as a pilot and qualitative study for baseline data to stimulate further research with a larger sample.

Computer technology use has become routine for optimal performance in the clinical dietetics settings. Increased computer use has occurred over time. Clinical dietitians can master well most of the productivity software in general. Use of specialized software is, however, a matter of hospital/facility policy, objectives, and goals. Promotion of the use of specialized software in clinical settings may need to be targeted to the management team in hospitals/facilities. Nutrition analysis and nutrition assessment are two specialized software mostly used by clinical dietitians.

The Internet has an important role in clinical dietetics for communication and information search. Teleconferencing through the Internet as a patient-dietitian interaction is currently at its infancy stage, but is expected to become popular and successful in the future. Ethical issues will be a concern ; standards, regulations and controls will be needed.

With the use of computers, positive changes observed are more on the management side such as better time management and more systematic procedures. Fewer perceived changes have been produced in the area of improving patient satisfaction. Further research could measure patient satisfaction from a patient's perspective instead of a dietitian's.

Various departmental supports are offered to clinical die-

titians on computer use, training is among the most popular ; meanwhile, lack of training is the 2nd top barrier to computer use, this finding reveals that the training may not be effective or adequate to properly deliver the required knowledge for computer use. This reinforces the need for dietitians to be prepared with the training before entry into clinical practice. The most commonly offered support might not be the most effective. This study did not look into the specific types of training provided by the department. The perceived effectiveness of each support was not investigated as well ; therefore, further research should look into this to identify the best supports for the dietitians.

A number of barriers with computer use have been identified in this study. Knowledge of the barriers encountered by dietitians on the use of computer technology can help the management team better accommodate the concerns of the dietitians and facilitate the effective and efficient use of computer technology for quality healthcare service delivery.

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