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Personal digital assistants: Essential tools for preparing dietetics professionals to use new-generation information technology*

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Abstract

Rapid integration of information technology into health care systems has included the use of highly portable systems-in particular, personal digital assistants (PDAs). With their large built-in memories, fast processors, wireless connectivity, multimedia capacity, and large library of applications, PDAs have been widely adopted by physicians and nurses for patient tracking, disease management, medical references and drug information, enhancing a quality of health care. Many health-related PDA applications are available to both dietetics professionals and clients. Dietetics professionals can effectively use PDAs for client tracking and support, accessing to hospital database or information, and providing better self-monitoring tools to clients. Internship programs for dietetics professionals should include training in the use of PDAs and their dietetics applications, so that new practitioners can stay abreast of this rapidly evolving technology. Several considerations to keep in mind in selecting a PDA and its applications are discussed.

Key Words: Personal digital assistant (PDA), information technology, dietetics professionals

Introduction

Personal digital assistants (PDAs) have been widely adopted in medical practice in recent years. Recent surveys of physicians have shown that 40 ~ 60% of physicians are using PDAs, and this percentage is expected to increase, possibly due to benefits from using the technology in their health practices (Carroll & Christakis, 2004; Criswell & Parchman, 2002; Larkin, 2001; Skyscape psychiatry PDA usage survey, 2004). Physicians, nurses, and other health professionals use PDAs for patient tracking, patient data management, disease management, e-prescribing, billing, medical references and drug information (Burdette *et al*., 2004; Fischer *et al*., 2003; Johnson *et al*., 2004; Stolworthy, 2005; VanDenKerkhof *et al*., 2003; Volsko, 2004). Use of PDAs by health professionals has been shown to increase efficiency of patient care and management, and to reduce medical errors (Chen *et al*., 2004; Grasso *et al*., 2002; McAlearney *et al*., 2004), resulting in an enhanced quality of health care.

Many of the features that have made PDAs an essential tool for health professionals, i.e. their portability, easy synchronization with computers, wireless connectivity, and variety of available applications, will make them equally central to the modern practices of dietetics. This report provides a general overview of PDAs and their potential applications as a resource for dietetics professionals, and lists considerations in selecting a PDA for professional use.

Basics

PDAs, also referred to as handheld computers, are light and pocket-sized digital devices that use a stylus or keyboard for input. PDAs were first introduced by Apple computer (Cupertino, CA) in 1993, and became more prevalent with the introduction of models by PalmOne Inc (Milpitas, CA) in 1996 (Volsko, 2004). PDAs are currently manufactured by many companies, including PalmOne, Sony, Samsung, IBM, Hewlett Packard, Compaq, Casio, Toshiba, and Dell. The most common types of PDAs are the Blackberry, Palm, and those using Windows Pocket PC. Table 1 summarizes a comparison among these major PDA types by their major features. Some other types of PDAs are Java/J2ME, Linux, and Symbian.

The common features of PDAs include an address book, calendar, memo feature, things-to-do list, calculator, making them useful (Rosenthal, 2004; Volsko, 2004). Recent PDA models have color screens, large built-in memory, expandable memory cards, fast processors, and multimedia features such as digital cameras, music players, and voice recorders. Many newly

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Table 1. A comparison of PDAs by operating systems

Comparison	Blackberry	Palm OS	Windows Pocket PC
Manufacturers	Research in Motion Ltd (RIM)	Palmone, Handspring Sony, IBM, Samsung	Hewlett Packard, Compaq Toshiba, Casio, Dell, Samsung
Cost	Ranges between $77 - $500	Ranges between $99 - $650	Ranges between $240 - $650
Memory	32 MB - 64 MB Expansion card (~ 2 GB)	8 MB - 256 MB Expandable memories	32 MB - 128 MB Expandable memories
Battery Life	Standby: 8 - 22 days Talk time: 4 - 5 hrs	Longer battery life 2 wks with typical use	Shorter battery life 3 days with typical use
Multimedia features	Internet access, hands free, video, GPS, maps, instant messaging, web browsing, etc.	Digital camera, MP3, voice recorder	Digital camera, MP3, voice recorder
Phone feature	Yes (Smartphone[1])	Yes (Smartphone[1])	Yes (Smartphone[1])
User-friendliness	Yes	Yes	No (System is more complex)
Program running	Runs several programs at once	Run one program at a time	Run several programs at once
Program development	Easier	Harder	Easier
Software availability	Not many About 23 medical - related applications available from Handango.com[2]	Currently more applications are available : About 1,400 medical-related applications are available at Handango.com[2]	Numbers of applications are increasing About 1,000 medical-related applications are available at Handango.com[2]

[1] Smartphone; a hybrid of PDA and phone.
[2] Handango.com; Online PDA application store, Accessed March 9, 2007.

developed models have wireless connectivity to computers and the Internet, using Bluetooth (short-range: within-30-feet), and Wi-fi (long distance: within-300-feet) wireless technologies. Smartphone, a hybrid of PDA and telephone, is also available, providing additional convenience to users. These multiple features have led to the wide adoption of PDAs as portable computers by health professionals.

Applications

Physicians and medical students install references and applications on their PDAs, and readily use them in their education and practices (Carroll & Christakis, 2004; Criswell & Parchman, 2002; McAlearney *et al*., 2004; McLeod *et al*., 2003). The applications most commonly used by residents and physicians are database management, medical references, clinical computation, patient tracking and drug information (Carroll & Christakis, 2004; Criswell & Parchman, 2002; Groote & Doranski, 2004; McAlearney *et al*., 2004; McLeod *et al*., 2003). Similarly, there are many health and nutrition-related applications available for use by dietetics professionals (Table 2). The National Institutes of Health provide health education materials, clinical guidelines, nutrient database, and calculators for Palm OS and Windows Pocket PC free of charge. There are also a number of nutrition assessment and health management applications available. As of May 20, 2005, there were more than 100 diet and exercise-related applications available at Handango.com (Handango.com, Accessed May 20, 2005). Dietetics professional can use these applications both to provide clients with effective assessment, education, counseling, and health care, and also to provide clients tools for self-monitoring and health management.

In addition to content-specific applications, dietetics professionals can also benefit from the general-purpose applications available. These include document processing applications (word processing/spreadsheet/slide presentation), the Portable Document Format (PDF) file viewer, an e-book reader, and a dictionary. The American Dietetic Association (ADA) is considering converting Medical Nutrition Therapy (MNT) protocol files into PDF files (McCaffree, 2001), thus making them readily available on PDAs. This resource would make the research-based evidence to support their advice and counseling readily available to dietetics professionals. The use of PDAs and their applications will have dietetics professionals easily and dynamically updated at the point of care (Hansen & Dorup, 2001; Johnson *et al*., 2004).

Buying Guidelines for PDA and Its Applications

The key variables to consider in selecting a PDA are the operating system, cost, memory, wireless features, and application availability (Chevan, 2004; Rosenthal, 2003; Volsko, 2004). PDA Web portals such as MobileTechReview.com (MobileTechReview. com, Accessed May 20, 2005), ZDnet.com (ZDnet.com, Accessed in May 20, 2005), and PCWorld.com (PCWorld.com, Accessed May 20, 2005) provide detailed information on a variety of PDAs, PDA product comparison charts, and users' guidelines, and thus serve as good Web resources for the first-time PDA buyers and current users.

The choice of operating system not only depends on the professional context of use but also on personal preference. More than 80% of physicians and residents in family practice residency programs and hospitals use Palm OS PDAs (Criswell & Parchman, 2002; Groote & Doranski, 2004; McLeod *et al*., 2003),

Table 2. Health related PDA applications and education materials for the use of dietetics professionals

Applications and health materials	Platform	Comment
Calculation tools		
ATP III Cholesterol management tool http://hin.nhlbi.nih.gov/atpiii/atp3palm.htm	Palm OS	Detection, evaluation, and treatment of high blood cholesterol
BMI calculator http://hin.nhlbi.nih.gov/bmi_palm.htm	Palm OS & Pocket PC	BMI calculator
Glucose control tool http://www.glucocontrol.org/eng/index.php	Pocket PC	Glucose management tool
Medical Tools http://www2.epocrates.com/products/medtools	Palm OS & Pocket PC	Temperature conversion, cholesterol log
Database & health information		
AIDS info tool http://aidsinfo.nih.gov/PDATools/	Palm OS & Pocket PC	AIDS guidelines, drug database, and HIV/AIDS glossary
Asthma education and prevention tool http://hp2010.nhlbihin.net/as_palm.htm	Palm OS	Asthma education materials
National Clinical Practice Guidelines http://guidelines.gov/resources/pda.aspx	Palm OS & Pocket PC	A list of clinical guidelines of different organizations
Nutrient Data Laboratory http://www.ars.usda.gov/Services/docs.htm?docid=5720	Palm OS & Pocket PC	Nutrient database SR 18. User's guide is available
Obesity Education Initiative http://hin.nhlbi.nih.gov/obgdpalm.htm	Palm OS & Pocket PC	Clinical guidelines on overweight and obesity
Diet & nutrition assessment applications		
Atkins Carb Counter http://www.atkinscarbcounter.com	Palm OS & Pocket PC	Personal diet & exercise log, $ 29.99
CalorieKing http://www.calorieking.com/software/ckmobplus.php	Palm OS	Personal diet & exercise log, $ 29.95
Diet & Exercise Assistant http://www.keyoe.com	Palm OS & Pocket PC	Personal diet & exercise log, $ 24.95
Nutrition Assistant http://www.compu-cal.com/index.htm	Palm OS	Professionals use, $ 199
Nutrition Toolbox http://www.nutrition-toolbox.com	Pocket PC	Professionals use, $ 179
NutritionRX http://www.hightechnutrition.com	Palm OS & Pocket PC	Professionals use, $ 149.99
References		
Journal To Go http://www.journaltogo.com	Palm OS & Pocket PC	Access to medical literatures and news
Pubmed on Tap http://archive.nlm.nih.gov/proj/pmot/pmot.php	Palm OS & Pocket PC	Retrieves Medline directly through a wireless connection to the Internet

Applications under each category are listed by an alphabetic order. Accessed March 9, 2007.

due to its user-friendliness, longer battery life, and a larger number of available medical-related applications. For patient care and education in clinical health settings, Palm OS PDAs are recommended to dietetics professionals considering compatibility with other colleagues and hospital systems. For private practices, the choice is increasingly a matter of personal preference and compatibility with clients, since the number of users of the Windows Pocket PC (40% of PDA users in 2004 compared to 16% in 2001) and its applications are steadily increasing (Gartner Dataquest, Accessed April 30, 2005).

It is essential to buy a PDA with built-in memory sufficient to install all the applications and references the purchaser intends to use on the PDA. For Palm OS, at least 32 MB of internal memory is recommended. For Windows Pocket PC, which requires more memory to operate, 64 MB of memory is recommended. A PDA with wireless connectivity is becoming increasingly important to provide remote access to central databases, electronic journals, medical news, and references (Burdette *et al*., 2004; Chen *et al*., 2004; Duncan & Shabot, 2000; Hansen & Dorup, 2001). Wireless PDAs are not yet in popular use, possibly due to a lack of knowledge, but the wireless feature will make PDAs real mobile tools for future health care since health professionals can provide patients with needed information anytime and anywhere (Chen *et al*., 2004; Duncan & Shabot, 2000).

Before purchasing PDA applications, it is best to evaluate trial versions, provided free for 15 ~ 30 days, to test the applications for user-friendliness and compatability with the intended use. Handango.com (Handango.com, Accessed May 20, 2005), Palmgear.com (PalmGear.com, Accessed May 15, 2005), and Tucows.com (Tucows.com, Accessed May 15, 2005) are the best-known online stores for PDA applications, and provide good information on the applications. Among these sites, Handango.com was our first choice. All applications it sells are well categorized by operating systems, and then by application types (e.g. business, databases, education, medical, health/fitness, personal productivity, etc). Comparable applications can be sorted by number of downloads, best-selling items, and review rankings, providing guidance in assessing application quality. Medical application sites such as MedicalWizards.com (Medical Wizards.com, Accessed May 15, 2005), PDACortex.com (PDACortex.com, Accessed May 15, 2005), Skyscape.com (Skyscape.com, Accessed May 15, 2005), and Unbound Medicine.com (Unbound Medicine.com, Accessed May 15, 2005) provide extensive information on a variety of medical applications by professions, specialty, and purpose of use.

Conclusions

The widespread adoption of PDAs by other health professionals points to their importance for dietetics professionals as well.

Information technology has become integrated within all aspects of health care, and will further enhance the quality of health care as it continues to improve (Burdette, 2004; Fischer *et al*., 2003; Grasso *et al*., 2002; VanDenKerkhof *et al*., 2003; Volsko, 2004; ZDnet.com, Accessed May 15, 2005). To the best of our knowledge, no information has yet been gathered on the extent and nature of PDA use among dietetics professionals, or their attitudes towards using PDAs and information technology. Research on dietetics professionals' use of PDAs and information technology would help increase awareness about the technology use in their practices for effective counseling, education, and health care for clients. Such research would also guide the development of education materials and training sessions to support dietetics professionals as they learn to use these cutting-edge technologies.

The inclusion of training in the use of PDAs in medical residency programs has been successful in preparing residents to use PDAs effectively in their education and practices (Criswell & Parchman, 2002; McLeod *et al*., 2003; Rao, 2002). This result suggests incorporating training in the use of PDAs in dietetic internship programs would help introduce the technology and its applications to the next generation of practitioners. Further research is needed to understand impacts of PDA implementation in dietetic internship programs as well as potential effects of PDA and technology use in dietetics practices.

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