

Nursing Students' Fingertips - Is PDA a Solution?

R Venkatesaperumal, JJ Clara, A Abu Raddaha, S Venkatesaperumal,
J Jambunathan, E Annitta, IJ Micheal

The 'information explosion' represents a significant challenge to the nursing profession on two fronts : (i) accessing information, and (ii) validating it for day-to-day application. The deluge of information resource is not only faced by the professional nurses but also by the nursing students.

Nursing shortage and understaffing in the clinical setting, fiscal restraints, prolonged wait times, and an aging population with complex medical conditions are some of the major challenges today's healthcare organisations face. Education within this scenario demands fingertip information that would promote active learning.

One way to assist nursing students to face these challenges is through empowering them to use appropriate technological device such as the personal digital assistant (PDA) which is a handheld computer also known as a palmtop computer. This has increased the access to patient records, ordering medications; educational resources are instantly available via the Internet or Intranet to promote knowledge transfer and clinical

excellence in care delivery.

There are a multitude of online healthcare resources in addition to e-journals, such as journals available through searchable databases such as MEDLINE, CINAHL, Scopus, PsycINFO and ProQuest, besides many other online reference materials and clinical guidelines.

Need for Information

Currently, the advancement of health care information systems is fast-paced due to the need for high and competent patient care measures, guidelines, and outcomes. Professional nurses and nursing students have usually carried many references in their pockets and lab coats to access clinical information. However, their clinical time might be spent in searching for relevant information, which might be outdated because printed publications may be out of date within a short period of time following the date of publication (Saba, & McCormick, 2006). Many nurses need updated information at the point of patient care to provide current evidenced-based practices. Such practices have the potential to improve nurses' re-

search utilisation and quality of care (Di Pietro et al. 2008). Hardware devices like the PDA have also had a dramatic effect on the manner in which health care is delivered. Di Pietro et al., mentioned (2007) that there has been "an 18% increase in sales to 13.1 million devices worldwide and the PDA has had the greatest impact due to its multifunctionality use as a phone, a camera, an organiser, and direct access to the Internet". Dale & LeFlore (2007) describe PDAs as "a delivery method for point of care information. The key in providing evidence at the point of care is the speed at which information can be delivered". The technology could thus speed up nursing students and the nurses to stay current.

Trend in Information Technology (IT)

The trend in IT is to provide greater functionality using smaller computers. In developed countries PDAs are infused into various levels of nursing programs right from the baccalaureate levels (White et al., 2005). The incorporation of PDA technology in clinical teaching settings can help nurses as well as nursing students to feel and reap the benefits of its use in providing quality nursing care.

Most of today's PDAs' operating systems are either Linux, PocketPC (Windows), or PalmOS (Palm). Since users can access the internet, intranet or extranet via Wi-Fi or Wireless Wide Area Net-

The authors are : Dept of Adult Health & Critical Care Nursing & Chairperson Clinical Training Committee; Assistant Dean for Clinical Affairs Head of Maternal and Child Health; Dept of Adult Health & Critical Care Nursing, College of Nursing, Sultan Qaboos University, Sultanate of Oman; Lecturer, Christaia Medical College Vellore, India; Professor & Director, Research & Grants, College of Nursing, University of Wisconsin Oshkosh, USA; Nursing Lecturer, Prince Sultan College of Medical Sciences, Kingdom of Saudi Arabia; Final BE Biomedical., St. Peter's Eng. College, India; respectively.

works (WWANs), they can enable users to connect to emails in the networked environments.

A typical PDA has a display/touch screen for entering data, USB connector, secure digital (SD) memory card slot for data storage, clock icon, menu icon, synch icon, contacts icon, scroll button/bar, headphone jack, speaker, reset button, stylus, and at least one of the following for connectivity: IrDA, Bluetooth and/or Wi-Fi. The capabilities and access are limited by the processing speed and memory, and of course, the faster and more robust the memory capabilities are, the more the unit costs.

A PDA typically includes software such as an appointment calendar, a to-do list, an address book for contacts and some sort of note program. Most PDAs, especially those used primarily as telephones may not have a touch screen, but use built-in soft keys, a directional pad.

Personal Digital Assistant for Health Care Professionals

Some educational institutions have integrated PDAs into their teaching practices, called mobile learning. PDA as a small, rechargeable, battery-operated handheld computer device helps access different information on personal and professional levels through loaded programmes (Cassey, 2007). A PDA has many characteristics in common with the Smartphone (a hybrid of PDA and telephone), but tends to have a longer battery life (6 hours to weeks) since it provides no support of voice (cellular) communications (Saba, & McCormick, 2006). The user-

friendly PDA can help in time management because many applications may work as stand-alone programmes since there is no need to connect to anything once they are loaded onto the device, thus simplifying the daily routines of different health professionals. The clinician can identify the services that can be available and supported through the PDA applications in order to provide better care services. In a study conducted by Di Pietro et al. (2008), it was revealed that nurses liked the PDA because of ease of carrying, its small size, and usability. In addition, by means of a wireless communication, any accessible information on the PDA can be exchanged anytime from anywhere in the health care facility to a PC and then into appropriate data servers (Luo, 2004).

PDAs are commonly allowed in classrooms for digital note taking. Students can spell-check, modify, and amend their class notes or "e-notes". Some educators distribute course material through the use of the internet connectivity or infrared file sharing functions of the PDA. Textbook publishers have begun to release e-books, or electronic textbooks, which can be uploaded directly to a PDA, reducing the number of textbooks students must carry. Software companies have developed programmes to meet the instructional needs of educational institutions such as dictionaries, thesaurus, word processing, software, encyclopedias and digital planning lessons.

Many school boards have modernised their computer policies to address concerns related to quiz or test taking.

Software companies such as Scantron Corp. have created programmes for distributing digital quizzes, which disable the infrared function on PDAs, thus eliminating the possibility of information sharing between students during the examination.

PDA and online information resources and clinical tools are essential for every professional working in today's mobile healthcare industry. Many colleges encourage the use of PDAs, and some business, nursing, and physician assistant (PA) programmes even require them (Wikipedia 2008).

Use of PDAs in Clinical Learning and Practice

PDA is becoming an essential clinical tool since they can provide information-of-need through the use of different available programmes such as assessment and diagnostic tools, drug and medical handbooks, and practice guidelines, etc. Information communication technologies such as the personal digital assistants can support health professional and nursing students with current information of interest, so the decisions being made will be evidence-based. (Ruland, 2002; Saba, & McCormick, 2006).

Nursing professionals have the responsibility to provide safe patient nursing care that includes the use of the most current accessible information. The use of PDA information systems enhances accurate clinical decision. The use of PDAs has been documented as a strategy to decrease the number of medical errors; missed care; and duplication of rendered care that threaten patient safety. It can also be used in pre-

ventive care by identifying the age-specific risk factors and applicable evidence-based educational tips and recommendations.

Rothschild et al. (2002) conducted a survey on physicians who had ePocrates drug database installed on their PDAs. The results indicated that the drug database saved their time in different clinical settings because it allowed them to access quick and updated information at the point of care with no significant effect in their normal workflow. They found that decision making capabilities and hence the quality of care were enhanced.

Research results support that PDAs enhance nursing clinical teaching and are effective resource for nursing students' education. PDA allows a wide range of technological resources to support students in various clinical settings (Koeniger-Donohue, 2008). The use of PDAs in the classroom, nursing laboratory, and clinical setting can bridge theory and practice thereby minimising the gap between education and practice. The simulation centers are gaining momentum in nursing education, and PDA can be used as an accessory device for both high and low fidelity simulators.

Fisher & Koren (2007) explored nursing students' experience using NVIVO computer software that were installed on their PDAs during their third and fourth years of study. They found that students positively viewed the PDA and the programme because of different reasons such as helping with information resource and retaining, clinical critical thinking activities, improving

nursing profession image, and enhancing quality of care.

PDAs are good curriculum support resource devices. Medical and nursing information products are available as a mobile educational resource for nursing students, medical students, and training physicians. As their careers progress, students may choose to subscribe to one of specialty-focused products where their courseware needs covered, either for general courses or for a specialty focus.

PDA is a great study tool for RN students because they can review classroom activities and avoid lugging fundamentals of nursing textbooks throughout clinical rotations. Packages such as clinical nurse companion, critical care nursing, Oncology nursing, Gerontology nursing, child care nursing and maternal care nursing are also available through many companies. Irrespective of the career path students choose, they will stay connected to the information resources that they need to consult and confirm in their practice (PEPID online, 2009).

White (2005) found that the infusion of PDA technology accelerated baccalaureate programme has been very successful based on the results of the first semester students concerning their baseline knowledge and prior use of PDA and the graduating students concerning their overall impression about PDA application in their nursing programme.

Benefits and Challenges in Using Personal Digital Assistants in Nursing Education Programmes (White, 2005)

Benefits of using PDAs

- ♦ Can be used anywhere/ anytime
- ♦ Allows convenient access to large amounts of data
- ♦ Increases student-faculty organisation in the clinical setting
- ♦ Improves student-faculty time management in documentation of clinical performance
- ♦ Encourages timely recording of significant events in the clinical setting, reduces paper usage through wireless transmission
- ♦ Prepares graduates for the future by embracing microtechnology use at the bedside

Challenges to Using PDAs

- ♦ Complying with Health Insurance Portability and Accountability Act (HIPAA) regulations
- ♦ Protecting patient confidentiality
- ♦ Encouraging consistent use by faculty and students in the clinical setting
- ♦ Troubleshooting synchronisation problems
- ♦ Acquiring software beyond the available Freeware

Nurses' Expansion and Fusion into IT Sectors

The use of PDA among nursing students involves technology and the understanding of the technology with which the PDA could be functionally tailor-made for nursing students. The examples of required PDA Software include: Quick Drug References, Calculators, Diagnostic Tests, Clinical Reference, and Dictionary (George & Davidson 2005).

The Clinical Quick Drug References offers latest drug up-

dates; many free programmes; adult & paediatric dosages; ePocrates: >3,300 brand and generic drugs including dosing, interactions, black box warnings, safety & monitoring, adverse reactions, & pricing; MultiCheck multiple-drug interaction checker and Replace outdated unit medication manuals. Calculators like MedCalc could have provision for drug dosages, IV drip rates, pediatric/adult conversions, BMI, Glasgow coma scale, urine output, mean arterial pressure, pregnancy calculator and many more (George & Davidson, 2005). Diagnostic Tests helps in accessing information related to laboratory, imaging, & microbiology tests. Unbound Medicine's Pocket Guide to Diagnostic Tests provides guidelines on the following: Which test is best to diagnose, screen, or follow a certain condition? How do I collect the appropriate specimen or prepare the patient for testing?; Where can I find more information on this test in the medical literature?

Clinical Reference enables students to look up diseases & diagnoses, differential diagnosis information, recommended diagnostic tests, recommended treatments and updated frequently with web resources. Dictionary serves a good solution for referring to definitions of medical terms, cross-links to other content in dictionary and pronunciations for some terms (George & Davidson, 2005).

PDA use in nursing colleges and schools has two strong rationale: one, instant access to a tremendous amount of clinical information and the other for gaining technical skills from using the devices that can be used throughout their career

path as in most of the western world. India being one of the strongest countries in the field of Information Technology catering to different parts of the world can attempt to expand this technology in the field of nursing.

Conclusion

It is hypothesised that PDAs will help nursing students be more effective and more organised throughout their clinical practice due to its ease of access of the current drug, clinical references, and medical calculators, among others. Nursing students can record patient data as they work, chart quickly and efficiently, and share data while preserving the confidentiality of patients. PDA is thus a solution for the nursing students to hold information at their fingertips. Such information enables them to stay current, thereby promoting safe and best patient care in any setting.

References

1. Cassey, MZ (2007). Information systems and technology: Keeping up with existing and emerging technologies: An interlocation to PDAs. *Nursing Economics*, 25 (2): 121-23
2. Dale JC & LeFlore J (2007). Personal digital assistants: Making the most use of them in clinical practice. *Journal of Pediatric Health Care*, 21, 339-42
3. Di Pietro T, Coburn G, Dharamshi et al. (2008). What nurses want diffusion of innovation. *Journal of Nursing Care Quality*, 23, 140-46
4. Fisher KL, Koren A (2007). Palm perspectives: The use of personal digital assistants in nursing clinical education: A qualitative study. *Online Journal of Nursing Informatics*, 11(2)
5. George LE, Davidson LJ (2005). PDA use in nursing education: Prepared for today, poised for tomorrow. Online. *Journal of Nursing Informatics*, 9(2)

6. Koeniger-Donohue R (2008). Handheld computers in nursing education: A PDA pilot project. *Journal of Nursing Education*, 47(2): 74-77
7. Luo J (2004). Portable computing in psychiatry. *Canadian Journal of Psychiatry*, 49(1):24-30
8. Rothschild JM, Lee TH, Bae T, et al. (2002). Clinician use of a palmtop drug reference guide. *Journal of the American Medical Informatics Association*, 9(3):233
9. Ruland CM (2002). *Healthcare Informatics* (1 edn). Natur och Kultur Stockholm. Saba VK, McCormick KA (2006). *Essentials of Nursing Informatics* (4th edn). New York: McGraw-Hill
10. White A, Allen P, Goodwin L, et al. (2005). Infusing PDA technology into Nursing Education. *Nurse Educator*. 30(4):150-54

Websites

- ◆ Evidence supporting efficiency and accuracy of novice nurse practitioners using personal digital assistants (PDAs). URL: <http://search.ebscohost.com/login.aspx?direct=true&db=cin2Q&AN=2009255956 & site=ehost-live&scope=site>
- ◆ Hartford Institute launches free PDA-based assessment tools. URL: www.cinahl.com/cgi-bin/refsvc?iid=374&accno=2009360203
- ◆ In the media. Columbia SoN selects Palm for patient-care initiative, article originally published at PDA cortex (<http://www.PDAcortex.com>). Accessed July 31, 2009
- ◆ PDA center. Coming soon to your PDA: an abundance of AACN continuing education multimedia resources. URL: www.cinahl.com/cgi-bin/refsvc?iid=833&accno=2009284999
- ◆ PEPID Online <http://www.pepidu.com/> Accessed July 31, 2009.
- ◆ Technology. Preparing text for PDA reading. URL: www.cinahl.com/cgi-bin/refsvc?iid=276&accno=2009045187
- ◆ The development of wireless PDA support systems for the comprehensive and intelligent triage of the emergency nursing. URL: www.e-papers.com.br Accessed July 31, 2009.
- ◆ PEPID RN. Student Clinical Companion Suite. Available at: <http://www.pepid.com/products/rnsc/default.asp> Accessed August 8, 2009.

