Computer applications in nursing are becoming increasingly evident. Today's computer has had irrevocable impact on the health care industry in general and most particularly on the nursing profession. The computer, therefore, is becoming an indispensable part of nursing practice.

The computer, a masterful machine, is an open sesame to a world of information for nursing. Technically, it may be defined as an information processing machine which operates by means of stored, modifiable, programs; and which generates on demand information through the use of various input/output devices.

With the advent of the silicon chip today's fourth generation computers can now store and process millions of bytes (b-y-t-e-s) of data at continually decreasing costs. One chip which contains tens of thousands of transistor equivalents can process far more data in a given amount of time than the 18,000 vacuum tubes built in the first generation computer.

In their present state, large scale mainframe and minicomputers which use the cathode ray tube (CRT or video terminal) have the capability of providing on-line access to the computer and processing real-time responses to any inquiry. Moreover microcomputers even though built to smaller scale, have emerged with similar capabilities, and are also becoming a fittingly familiar part of our environment.

The present-day computers are considered to be truly user-friendly. That is, they employ high-level languages which are relatively easy to write. These languages include BASIC (Beginners All Purpose Symbolic Instruction Code); COBOL (Common Business Oriented Language); FORTRAN (FORMula TRANslator); and MUMPS (Massachusetts General Hospital Utility Multiple Programming System).

The computer applications for nursing that are evident today are a result of nursing having to accommodate to the demands of a changing society and changing profession. In face of such changes nurses have needed to: (a) store in an organized manner large volumes of patient care data; (b) uniformly document patient care in relation to patient care standards; (c) generate information for quality and cost control; (d) and communicate in a timely, reliable manner data essential for decision-making. And in addition and all at the same time capitalize on the extended care of nursing.

Currently computer applications are to be found mainly in the four nursing areas: (1) administration; (2) practice; (3) education; and (4) research.

Let us consider the first area of computer applications in nursing administration. Computerized Hospital/Medical Information Systems (HIS/MIS) have very clear connection with the indirect care of patients. Most of the 1900 hospitals that have some type of HIS/MIS use them primarily as managerial systems. They are important administrative aids in respect to financial management, including billing and budget preparation; to admission/census control; and to personnel, payroll, and materials management. And since the nursing department is the largest single workforce in any hospital it is administratively involved and affected by the HIS/MIS.

Also every hospital nursing administrator needs to be aware, there are special purpose systems available as separate entities or as HIS/MIS subsystems. Special purpose systems are variously concerned with patient classification; nurse staffing and scheduling; nursing audit; and quality assurance. In a relatively new development, the nursing position systems that have emerged utilize computerized patient classification data as a basis for predicting nurse staffing requirements. Likewise the quality assurance systems integrate patient care audit data to establish quality care criteria. All are similarly of importance to nursing administration.

In the area of public health/community health computerized information systems are affecting the administration of both direct and indirect patient care. These systems are facilitating not only billing; and not only financial and statistical reporting; they are additionally providing management information relative to client registration and scheduling. Also, by documenting health care indicators, they contribute to the management of patient care.
In the second area of computer applications in nursing practice, computers are affecting the direct care of patients by nurses. In hospitals with intensive and critical care units, physiological monitoring systems which continuously monitor the health states of patients are found. Hospitals are also using patient care information systems to advance the communication of direct patient care including such aspects as order-entry and other patient care data.

In some hospitals, these patient care systems are in place as subsystems of a broader hospital/medical information system; in others they may function as independent systems. In the latter case their role is to document nursing care plans, protocols, and certain elements of the nursing care process. Further, there are other patient care support systems or subsystems being used to record data relating to pharmacy, laboratory, radiology, and pulmonary function.

In the next area of computer applications in nursing education, Computer-Assisted Instruction (CAI) for patients, nurses, and students has long proved its value in nursing education. CAI has traditionally been available only on a mainframe or mini-computer. Today, for the most part, CAI lessons are now being developed and available for use on microcomputers.

In both hospitals and educational institutions, per se, CAI is a valued resource. Hospitals rely on CAI for patient instruction and for staff inservice education. Nursing schools utilize CAI for teaching tutorial, drill, and nursing practice concepts. Moreover, computer simulations of real-life situations are a resource for improving the decision-making and problem-solving skills germane to nursing. Such simulations, for example, can serve to depict nursing intervention, for certain patient conditions without jeopardizing patient actual care; and can also demonstrate the outcomes of those specific interventions. They are useful, moreover, for heightening the observational skills essential to nursing of a high order. Computer simulation models are further useful for forecasting patient outcomes, assessing community health status, and identifying patients at high risk.

And in the last area of computer applications in nursing research, computers are advancing nursing science. Computerized document retrieval systems that produce bibliographic references and/or abstracts are a prime resource for the very first step in any nursing study, namely the literature search. Computerized statistical packages are available for all types of computers - from mainframe to mini- and microcomputers - and are now employed for processing research findings and helping nurse investigators to evaluate, model and forecast elements in clinical practice. And, finally, research and development of computer applications in clinical nursing practice is emerging which will provide the profession with a new core of nursing knowledge.

There can be no doubt that the computer applications in nursing will affect the entire nursing profession. All nurses will need to take full advantage of this technology. They will continually have to set goals and discover new computer applications. They must become expert developers of software. They must work steadily, relentlessly, to create data bases for nursing in all types of health care facilities. They must not ignore the need for validated classification schemes for various nursing areas. They must design models of patient care, create simulations of the nursing process; and envision still other creative uses for the new willing nurse-friendly partner.

To accomplish all of these applications nurses will have to become computer literate; they will have to become developers of software, and they will need to assist in the design and development of systems specific for nursing administration, practice, research and education. Also, they need to achieve mutually servicable relationships with vendors of both hardware and software; service agencies and consulting firms; and with health care facilities that have responsibilities for computer systems.

In summary, the computer, is becoming a friend and partner of nursing. The hardware is available and economical; and a good deal of software has become available. But it is members of the nursing profession, who must choose and live by our own specific lists of priorities and watchwords. It is now up to the nursing profession to utilize and nurture it to ensure the quality of patient care and move into a new era of nursing.

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