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# Computerization and its contribution to care quality improvement: The nurses' perspective

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## ABSTRACT

**Background:** Despite the widely held belief that the computerization of hospital medical systems contributes to improved patient care management, especially in the context of ordering medications and record keeping, extensive study of the attitudes of medical staff to computerization has found them to be negative. The views of nursing staff have been barely studied and so are unclear. The study reported here investigated the association between nurses' current computer use and skills, the extent of their involvement in quality control and improvement activities on the ward and their perception of the contribution of computerization to improving nursing care. The study was made in the context of a Joint Commission International Accreditation (JCIA) in a large tertiary medical center in Israel. The perception of the role of leadership commitment in the success of a quality initiative was also tested for.

**Methods:** Two convenience samples were drawn from 33 clinical wards and units of the medical center. They were questioned at two time points, one before the JCIA and a second after JCIA completion. Of all nurses ( $N = 489$ ), 89 were paired to allow analysis of the study data in a before-and-after design. Thus, this study built three data sets: a pre-JCIA set, a post-JCIA set and a paired sample who completed the questionnaire both before and after JCIA. Data were collected by structured self-administered anonymous questionnaire.

**Results:** After the JCIA the participants ranked the role of leadership in quality improvement, the extent of their own quality control activity, and the contribution of computers to quality improvement higher than before the JCIA. Significant Pearson correlations were found showing that the higher the rating given to quality improvement leadership the more nurses reported quality improvement activities undertaken by them and the higher nurses rated the impact of computerization on the quality of care. In a regression analysis quality improvement leadership and computer use/skills accounted for 30% of the variance in the perceived contribution of computerization to quality improvement.

**Conclusions:** (a) The present study is the first to show a relationship between organizational leadership and computer use by nurses for the purpose of improving clinical care.

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(b) The nurses' appreciation of the contribution computerization can make to data management and to clinical care quality improvement were both increased by the JCI accreditation process.

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## 1. Background

In recent years, in the context of Israeli hospitals' drive for excellence, particular emphasis has been given to the development and incorporation of computerization in clinical work, for the purpose of measuring and evaluating quality of care and to upgrade the management of improvement initiatives. In the past decade, one of the most significant developmental initiatives in the Israeli healthcare system has been to invite the Joint Commission International (JCI) to conduct external reviews of patient safety and quality of care in Israeli hospitals, with a view to winning JCI accreditation.

### 1.1. The JCI accreditation process in the Rabin Medical Center

Preparing for JCI accreditation (JCIA) is complex. The work has to be based on JCI standards and requirements [1] and usually lasts for two years. In fact, this preparation entails no less than broad organizational change and a new reality in hospital management, especially with regard to quality and safety management, and optimizing internal mechanisms and systems. A wide range of services and policy directions have to be restructured, with the prime focus on the training, clinical and managerial issues which jeopardize the quality and safety of medical, nursing and other aspects of in-hospital care and services. The Rabin Medical Center (RMC) went through two years (2008–2010) of intensive work and improvements before the Center was approved and certified by the JCI.

One of the central components of quality improvement is upgrading the hospital's capacity to manage information and measure change in processes and outcomes. The fundamental requirement is the installation of high-tech information technology and electronic databases across the whole organization [1,2]. The implementation of this technology is challenging. It is usually perceived as a major organizational change and may well encounter employee resistance. The readiness of staff to work with computerization is contingent on their computer skills, their acceptance of the importance and value of the technological shift, especially its contribution to quality of care, and their personal capacity to deal with this challenge. As a part of JCIA preparation, staff members on all organizational levels found themselves obliged to operate advanced computerized systems, absorb and process large amounts of information, and themselves carry out a number of changes and improvements in the computer systems installed.

### 1.2. Nurses and computer use

Technological changes in healthcare have made computer literacy a necessary nursing skill but a recent study of 346 nurses

enrolled in a post-basic training course in the UK reported inadequate computer literacy, especially among older and female nurses [3]. A national survey in Australia found that 74–94% of nurses made some use of computers but that more computer use was reported by the more highly qualified nurses and those in senior positions. Work demands, workload and staff turnover were barriers to computer use [4]. A study in South Africa looked into the main reasons for computer use by nurses and found that nurses used computers to type care plans, and to access information and the latest protocols (77%, 55%, and 42% of nurses respectively). It also found that a lack of nursing management support was another barrier to computer use [5]. Nurses' perception of the usefulness and ease of computer use predicts their attitude to computerization [6]. The more nurses used computers the more positive their attitudes to them [7].

It is generally accepted that computers promote the quality of care. A number of studies report how computerization has contributed to improved documentation, to the ordering of medications and to reconciling medical records [8–10]. Computers have helped implement clinical guidelines and improved clinical care [11,12]. They have supported clinical decision-making [13,14]. A systematic review reported a significant improvement in care after the implementation of computerized clinical guidelines [15]. However, some issues are still controversial. Himmelstein, Wright and Woolhandler [16] conducted a national survey using data from some 4000 hospitals in the U.S. They reported that computerized hospitals had higher costs and that the computerization process had improved the quality of care only slightly.

The authors of the present study have located no studies of the views of nurses on the contribution of computerization to care quality improvement. However, studies on related topics might give some indication as to these views. For example, in a survey of medical staff, most of whom were nurses, reported that the participants felt that the medical facilities did not know how to make efficient use of medical data on electronic medical records [17]. A systematic review of the use of information from patient-reported outcome measures in order to improve the quality of healthcare (nurses participated in many of the studies reviewed) concluded that technology can play a greater role in information processing [18]. These studies suggest that nurses see a positive potential in information technology for the improvement of patient care.

### 1.3. Leadership for quality improvement

In quality improvement, a committed leadership is considered to be key. The literature reports the importance of this variable at all levels of the healthcare system – from the global and national strategic level through the senior management of medical services and institutions, down to the

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