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Impact of Computerized Order Sets on Practitioner Performance

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Abstract: Order sets have the potential to provide evidence at the point of care and improve healthcare practice. In this study we reviewed the literature to assess the effect of computerized order sets on practitioner performance. Our search in PubMed and Science direct identified 442 studies of which 16 met our inclusion criteria. In 15 studies order sets contributed to the improvement of at least one performance outcome. The effect of order sets was evaluated on 34 performance outcomes, of which 19 were improved and the rest remained unchanged. The results provide evidence that the use of order sets can improve health care practice.

Keywords: Order set, practitioner performance, CPOE, clinical guideline

Introduction

Integrating evidences in the treatment process has been one of the challenges for care providers. One solution is the use of order sets. An order set is a group of predefined orders that is used directly by a physician to create orders for a specific patient [1]. Order sets are expected to increase compliance with guidelines. To provide evidence at the point of care many of them are integrated with Computerized Physician Order Entry (CPOE) systems. CPOE systems can reduce error rates [2] and improve performance and adherence to guidelines [3]. However, it is unclear to what extent the improvements are related to integrated order set. Therefore, the main objective of this study is to evaluate the impact of computerized order sets on practitioner performance.

1. Methods

We searched PubMed, Science direct, and the reference lists of relevant articles for randomized control trials and comparative studies that assessed the effects of order sets on practitioner performance. Three groups of key terms concerning: (1) computerized systems, (2) evidence-based practice, and (3) order set were used. Operator “OR” is used within groups and the following combinations were applied; (1 OR 2) AND 3. Two reviewers judged titles and abstracts, and inter-observer reliability was assessed by Cohen's kappa. An extraction form was designed based on the literature [4;5] and expert consensus. Two reviewers completed the form for each study. Disagreements concerning study selection and data extraction were resolved through discussion.

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2. Results

Of 442 retrieved articles, when limiting to comparative and trial studies, 98 articles remained. The review of titles and abstracts left 360 articles. Fourteen studies were identified by full text review and two by the review of reference lists (Cohen's kappa=0.91). Most studies (69%) reported that the order sets were implemented in CPOE System. In 63% of the studies (n=10) guidelines were used to develop the order sets. Fifteen studies showed an improvement in at least one of the outcomes (Table 1). Compliance with guideline was the most frequently evaluated practitioner performance.

Table 1. The effect of computerized order set on practitioner performance

Source	Order set	Performance outcomes	Effect*
Chan et al [6]	General admission	- Completion time - Number of ordering errors	+ 0
Chisolm et al [7]	Asthma admission	- Compliance with evidence-based treatment	+
Haynes et al [8]	Post operative anti bacterial	- The proportion of discontinued antibacterial wound prophylaxis in the appropriate time frame	+
Munasinghe et al [9]	General medicine admission	- The use of order set	+
Schnipper et al [10]	Diabetes management	- Use of insulin during the hospitalization - Adequacy of basal dose - Use of scheduled nutritional insulin - Adequacy of nutritional dose - Correct type of nutritional insulin - Use of supplemental insulin - Glycosylated hemoglobin testing - Clinical inertia	0 0 + 0 0 + 0 0
Asaro et al [11]	Acute coronary syndrome	- The use of order set - Compliance with guideline recommendations	+ 0
Ozdaz et al [12]	Acute coronary syndrome	- The use of order set for: Suspected acute myocardial infarction (AMI) - Compliance with guideline for suspected AMI For early aspirin ordering For early beta-blocker ordering - Compliance with guideline for confirmed AMI	+ 0 + 0 0
Ballard et al [13]	Adult pneumonia	- Compliance with guideline recommendation	+
Hauck et al [14]	Community-acquired pneumonia	- Performance of blood cultures - Use of guideline recommended antibiotics	+ +
King et al [15]	Bronchiolitis for children	- Frequency of antibiotics ordering - Frequency of bronchodilators ordering - Frequency of corticosteroids ordering	+ 0 0
Micek et al [16]	Severe sepsis and septic shock	- The quantity of administered intravenous fluids - The prescription of appropriate antimicrobial	+ +
Khajouei et al [1]	Promyelocytic Leukemia	- Ordering efficiency	+
Caslin et al [17]	Heart failure	- Compliance with guideline recommendation	+
Chima et al [18]	Diabetes	- Tracking patient outcomes	+
Shapiro et al [19]	Sepsis treatment	- The use of essential therapies	+

* + = positive effect and 0= no effect, Number of evaluated practitioner performance=34, improved= 19

3. Discussion

This study revealed that use of order set can enhance practitioner performance. The included studies evaluated heterogeneous order sets; from general to disease specific order sets. Similar systematic reviews [2;4;5] did not investigate application of order sets as a factor affecting performance. They showed providing guidelines at the point of care significantly improves patient care and reduces practice variability. One study [11]

reported that practitioners use order sets to facilitate ordering process rather than using the offered guidance. However, the use of order set showed an improvement in the compliance with guidelines in most studies.

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