Feature Article

An Integrated Review of Research Using Clinical Decision Support to Improve Advance Directive Documentation

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The Patient Self-determination Act requires that health care institutions inform patients of their right to make health care preferences known through advance directives. However, actual advance directive documentation remains low. This study's purpose is to identify and analyze research studies incorporating clinical decision support to improve rates of advance directive documentation. In addition, variables impacting advance directive documentation are identified. Literature searches were performed in the Cumulative Index of Nursing and Allied Health Literature, PubMed, and Scopus between 1998 and 2015. Search criteria yielded more than 2000 results using various search engines, yielding 34 articles with 35 studies total. Articles included 17 studies describing electronic health record–based decision support interventions for advance directive documentation (Supplemental Digital Content 1). In addition, 18 studies assessed factors influencing advance directive documentation (Supplemental Digital Content 2). Findings suggest that decision support–based reminders are effective in improving advance directive documentation. Use of e-mail reminders for patients before patient visits through electronic health record portals provides a mechanism to improve advance directive documentation rates. Furthermore, major factors influencing advance directive documentation include inconsistencies in end-of-life preferences between patients and providers and inconsistencies in patients' preferences over time.

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KEY WORDS

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The importance of honoring patients' wishes at the end of life (EOL) cannot be overemphasized. Globally, there is a push to ensure that more people prospectively document their EOL care preferences, often in the form of an advance directive (AD).[1] An AD is a legal document that outlines a person's care preferences and wishes, should his/her decision-making ability be diminished as a result of a critical illness or cognitive impairment.[1] The Patient Self-determination Act, enacted in 1990, requires health care institutions that receive Medicare and Medicaid funding to inform patients of their right to make their health care preferences known through execution of an AD, which can be a living will and/or to appoint a surrogate decision maker.[2]

The right to self-determination is fundamental in clinical ethics. End-of-life conversations and ADs have been shown to decrease the likelihood of in-hospital death, improve the quality of care, and lower health costs in the final week of life.[3] Achieving concordance between patients' EOL care preferences and the care they received is a high priority in health care.[4] Improving communication about patient preferences and documentation of patient preferences is important. Errors, such as a patient who wanted comfort care only but received full cardiopulmonary resuscitation because the correct documentation had not been completed, can cause unnecessary significant harm and suffering for patients and families.[4]

ADs in the Era of Electronic Health Records

Electronic health record (EHR) in this article is defined as an electronic version of a patient's medical history, which is maintained by multiple providers over time, and may include all of the key administrative clinical data relevant to that persons care under a particular provider, including demographics, progress notes, problems, medications, vital signs, medical history, immunizations, laboratory data, and radiology reports.[5] There are many benefits of EHR use, especially in the areas of medical error reduction,

compliance, completeness of records, decision support, accurate billing, and even returns on investment.[6] For instance, EHR improves the accuracy, efficiency, and quality of data recorded in a health record, enhancing health care practitioners' access to information, enabling information to be shared by all.[6] Electronic health record improves the quality of care as a result of having health information immediately available at all times for patient care. Having accurate information immediately available through an EHR for clinicians is crucial when EOL decisions are being made about patients, at a time when AD is needed most.

Clinical Decision Support

Clinical decision support (CDS) is a process designed to aid directly in clinical decision making, in which characteristics of individual patients are used to generate patient-specific interventions, assessments, recommendations, or other forms of guidance that are then presented to a decision-making recipient or recipients that can include clinicians, patients, and others involved in care delivery.[7] Clinical decision support is a tool constructed within the EHR and used to automate clinical alerts or messages that encourage the health care team to do the right thing at the right time, suggesting evidence-based interventions for appropriate care delivery.[8]

Clinical decision support provides clinicians, staff, patients, or other individuals with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care.[9] Clinical decision support encompasses a variety of tools and interventions such as computerized alerts and reminders, clinical guidelines, order sets, patient data reports and dashboards, documentation templates, diagnostic support, and clinical workflow tools. Clinical decision support has the potential to improve patient safety and outcomes for specific populations, as well as compliance with clinical guidelines and standards of practice and regulatory requirements.[10] Clinical decision support provides a safety net by reminding hurried providers of clinical guidelines and assist in error detection before harms occur.[11] Researchers exploring CDS use, to guide provider's identification of AD preferences, consistently found improvement in the ability of the provider to act in accordance with patient preferences after identifying their EOL wishes.[12] Clinical decision support, which uses EHR-based reminders, has been found to be effective in improving AD documentation rates.[13]

Specific Aims

There were 2 specific aims for this study: (1) to identify and analyze literature from research studies that incorporate CDS used in EHR to improve rates of AD documentation and (2) to identify variables in the literature that impact AD documentation.

METHODS

Search Strategy

In this study, the authors searched 4 databases that are known for a high level of empirical evidence contained in peer-reviewed literature. Key search terms with a specific focus on EHR and CDS use to improve AD documentation rates were incorporated. Search terms were repeated in identical sequence using different search databases specified above for consistency between searches. Additional search strategies included ancestry searches of relevant literature found in citations of the search results. To enhance the quality of this integrative literature review, only peer-reviewed research studies were included. Quantitative, qualitative, and mixed-methods research was included, which is acceptable in integrative literature reviews.[14] Studies were included using CDS to improve AD documentation and/or variables that influence AD documentation, such as patient' and physician's attitudes, perceptions, and inconsistencies. Finally, studies written in the English language and published between the period 1998 and 2015 and international studies were included. Non-peer-reviewed case reports, letters to editors, reviews, and book chapters were not included in this review. The Figure provides details of the search strategy and results.

ANALYSIS

Data Extraction and Synthesis

Microsoft Excel 2013 was used to create a literature matrix to facilitate a constant comparative methodological
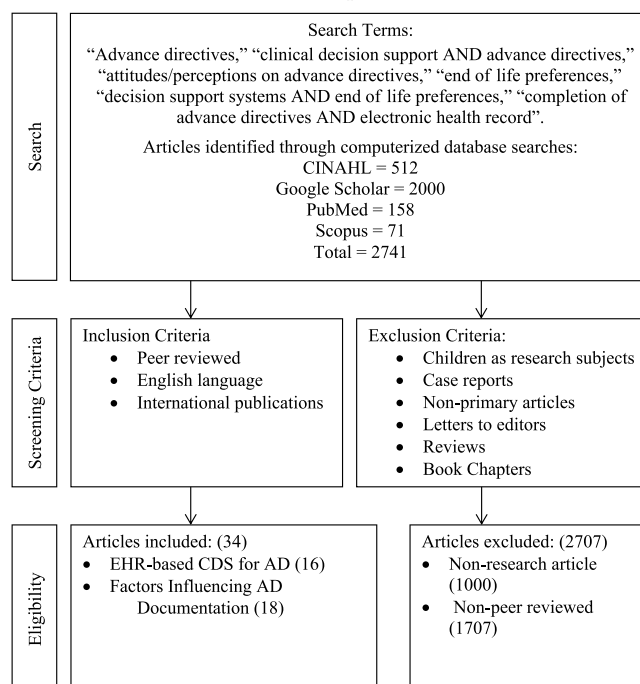

FIGURE. Literature search results.

approach during data extraction. Characteristics of selected articles were ordered, coded, categorized, and summarized in a unified way to allow each article to be compared constantly to others. Characteristics collected included authors with year of publication, aims of the study, study design, types of CDS interventions, study sample and settings, methods, and major findings. Finally, reference matrices were sorted by the year of article publication to assess research timelines.

As a result of this comparative method, literature was grouped into 2 categories based on the similarity of content. This process allowed researchers to organize data into a meaningful classification system based on content, resulting in 2 tables that facilitated responses to the specific aims, including CDS interventions for AD documentation (Supplemental Digital Content 1, http://links.lww.com/JHPN/A11) and factors influencing AD documentation (Supplemental Digital Content 2, http://links.lww.com/JHPN/A12).

Assessing Methodological Rigor and Relevance of Literature

During the data extraction and synthesis methods, each of the publications was assessed for methodological rigor and relevance. The final sample of publications meeting inclusion criteria included studies using many methodologies. To help strengthen the quality of this review, the authors systematically rated the methodological and theoretical rigor of the study designs using a high, medium, and low classification schema. High methodological rigor included studies that included randomized control trials or meta-analyses. Medium rigor studies included nonrandomized controlled studies with prospective and retrospective methods, cohorts, and case-controlled studies. The low rigor group included studies that were noncontrolled descriptive studies, case studies, consensus or opinion papers, manufacturers' recommendations, or anecdotes.

Data relevance was also rated as part of the assessment of study quality for each publication. Data relevance was defined in this study as a publication that provides evidence that has direct bearing or connections with specific aims of the integrative review.[15] Studies that had data relevance were scored a 1; studies that had little relevance to specific aims were scored a 0. Two authors independently rated both the methodological rigor and the data relevance for all articles, and κ scores were calculated to ascertain agreement between reviewers on the ratings.

RESULTS

Methods yielded more than 2741 articles from the databases searched. An initial review of the article's title and abstract was conducted by the primary author for the 2741 articles; 2707 articles were eliminated that did not meet the purpose of this research. The articles were further scrutinized by further reviewing the abstracts and some of the content of these articles. This method yielded a total of 34 articles included in the review. However, 35 studies were included in this integrative review because 1 research study[16] contained 2 separate studies. These 34 articles included a total of 17 research studies describing EHR-based CDS interventions for AD documentation (Supplemental Digital Content 1, http://links.lww.com/JHPN/A11) and 18 articles assessed factors influencing AD documentation (Supplemental Digital Content 2, http://links.lww.com/JHPN/A12). The methodological and theoretical rigor of these study designs was examined by both authors and included research studies classified as high (4), medium (15), and low (16) rigor. The highly rigorous studies included large and small sample randomized-control trials. Many more studies were included that used less rigorous research designs. Finally, the relevance of the selected studies were examined and rated individually by each author. Calculated κ score indicated good agreement (0.92) between 2 individual raters that all studies included in this integrated review were relevant to the specific aims.

DISCUSSION

Documentation of AD is an essential component of the care provided to patients at the EOL. Documentation of an AD is an established process for patients or caregivers to communicate their preferences to health care providers for medical care during critical illness, should they ever lose their capacity to make medical decisions or articulate their wishes.[17] Benefits of this process include patient empowerment, autonomy, and decreased resource utilization. Patients who have completed ADs are more likely to receive care in line with their preferences, whether for intensive medical intervention or for limitation of active care.[18] Advance directives are associated with fewer hospital deaths, increased use of hospice care, fewer intensive care admissions, and fewer life-prolonging measures.[18] In turn, these factors are associated with better patient quality of life at the EOL. The presence of an AD has been linked to less caregiver stress, anxiety, and depression; less distress during bereavement; and increased satisfaction with communication and care.[19,20]

Use of AD at EOL has been shown to decrease the likelihood of in-hospital death, improve the quality of care, and lower health costs in the final week of life.[3] Despite these benefits, actual AD documentation in many health care settings remains low, estimated at 18% to 36% of adults[3,20,21]; less than half of adults with a serious chronic or life-limiting illness have completed an AD and many physicians are unaware their patients have completed an AD.[20] Also, the rates of documentation of EOL care preferences in the medical record remain low.[16]

Interventions to Improve Documentation of ADs

Researchers have reported several promising interventions to promote documentation and execution of ADs.[3,16,22] Interactive interventions, which provide opportunities to ask questions and receive assistance from a knowledgeable person, were shown to be more effective than didactic interventions, which provide education in the form of a program, clinical encounter, or mailing. Interactive interventions, which provide opportunities to ask questions and receive assistance from a knowledgeable person, were shown to be more effective than didactic interventions, which provide education in the form of a program, clinical encounter, or mailing. The most successful interactive interventions include repeated conversations about completion of ADs over time.[22]

Among other interventions to improve discussion and documentation of AD, 1 method that has been identified by researchers to encourage better AD documentation is by using the EHR, such as clinician-directed alerts through a CDS system. Leading health care organizations have stressed the importance of integrating EHRs into health care systems to increase quality of care to improve documentation.[23] In fact, increasing the adoption of EHRs with integrated CDS is a key initiative of the current US health care administration.[24] The development of various tools, such as CDS in the form of clinician-directed alerts in the EHR, is 1 of the strategies built into key EHR adoption initiatives that can be very effective in improving adherence to AD documentation rates.[25]

Electronic-Based Interventions to Improve AD Documentation

In the course of this review, a number of studies found that EHR interventions increased AD documentation in seriously ill patients. Electronic health record interventions increased the frequency of do-not-resuscitate orders and orders limiting other life-sustaining treatments.[26,27] Furthermore, CDS-based reminders that are part of EHR were effective in improving AD documentation rates.[3,26,28,29] However, outcomes like these were not always consistent, for instance, investigators of a study[16] that assessed the rate of code status documentation in the EHR of patients with metastatic cancer reported that despite the incurable nature of metastatic cancer, a minority of patients had a code status documented in the EHR. Overall, articles in this integrative review suggest that further research is needed to establish whether improved AD documentation using EHR with CDS truly impacts inpatient management of care.

Some other interventions such as mailings to a health care proxy, living will forms, and literature to patients before an appointment, at which their physicians also received a reminder to document AD, can create significant improvements in AD documentation. This was demonstrated in a study that assessed 2 simple interventions to improve completion of AD among elderly or chronically ill outpatients. The results of the study showed that a combined intervention of a mailing to patients and a reminder to their physicians resulted in a substantial increase in the completion of AD, although the absolute proportion of patients completing them was still low. After adjusting for clustering and demographic variables, the benefit of a mailing remained highly significant. In addition, delivery of a computerized reminder alone had no effect, suggesting that all of the benefit was related to the mailings. Indeed, the study suggests that a patient-focused intervention may be much more effective than a physician-focused intervention alone.[28] Furthermore, in another study, brief e-mail prompts, timed to critical decision points in treatment and designed to encourage clinicians to discuss and document patients' resuscitation preferences in the outpatient EHR, improved the rate and timing of code status documentation.[16] Moreover, the use of e-mail reminders to patients before patient visits through EHR portals can provide a mechanism to improve AD documentation rates.

In addition, a prospective quality improvement study was conducted in outpatient clinics using the EPIC EHR. The intervention included implementation of a reminder system consisting of the addition of an AD counseling module. The results showed that EHR-based reminders were effective in improving documentation rates of ADs.[3] However, in other research, an organized patient education process, such as a previsit resource mailing, was needed for a CDS system to be effective.[30] Implications of approaches that link electronic reminder systems with patient education are a feasible way to help patients document their preferences. Furthermore, at least 1 intervention demonstrated how a simple process change using existing electronic resources can affect the quality of care at the EOL.[30] Future studies examining care processes that incorporate electronic resources like these delivered to more diverse patient populations are needed.[30]

In addition, some investigators are interested in how technology is designed to promote better AD documentation. For example, a well-designed clinical decision support system interface, available to nurses at the point of care during decision-making workflows, which incorporates denser features related to AD documentation embedded in computer screens, can influence care plan changes that may yield better patient outcomes.[31] This is accomplished by logically grouping CDS features (ie, consolidating multiple CDS features in a single window so users could view information all at once), which should have a positive effect on the nurse's ability to find information quickly at a glance. That is, grouping information resources, like AD documentation, in the EHR creates an easily accessible and readily available reference for care providers.[13] Examples of grouped features include graphs showing trends of multiple patient outcomes that could be correlated, such as pain and anxiety

about death; electronic, searchable tool tips containing evidence-based information; and pop-ups that include suggestions for changes to the plan of care based on the patient profile. However, providing improved interfaces does not mean that information will be used effectively. Personal navigation style also predicts whether nurses will make changes recommended within the CDS.[31] However, most of the literature sources found do not provide detailed information about EHRs or CDS, such as vendor name, in order for interested stakeholders to draw comparisons between different technologies and how users feel about them. This type of information is critical as more information gets published about using EHRs and CDS in clinical environments, so that features of effective design and use, such as AD documentation and assessment screens, can be compared across different technologies. This information will enhance the evidence base about technology use for future implementations.

Factors Influencing AD Documentation

In this review, 18 articles were included that described various factors influencing the consistency of AD documentation among patients, caregivers, and providers. The inconsistencies in EOL preferences between patients and providers were evidenced in these studies.[21,32-34] A research study[32] found that agreement between patients' preferences and physicians' perceptions of these preferences was low. Most (55%) of 1010 patients with cardiopulmonary resuscitation (CPR) preference information available desired CPR; compared with these patients, fewer physicians wanted CPR (36%) if they were in their patients' condition. Most of the disagreement occurred when the physician's prognostic estimate was worse than the patient's. Another study[35] also found that only 13 (6.2%) of 209 patients had any documented reference to CPR code status. A similar study[36] found that most (56%) of emergency room physicians have attempted more than 10 resuscitations in the past, despite expectations that such efforts would be futile. Most providers attempt to resuscitate patients in cardiopulmonary arrest regardless of poor outcomes, except in cases where a legal AD is available.

Furthermore, other authors[37] found that only 68% of patients (220/325 patients) received care consistent with baseline preferences. The proportion was slightly higher among patients who recognized they were terminally ill (74%, 90/121 patients; $P < .05$). Patients who reported having discussed their wishes for care with a physician (39%, 125/322 patients) were more likely to receive care that was consistent with their preferences.[33,34,38-41]

One other finding was that inconsistencies in patients' preferences may be stated in the AD over time. In an observational study,[42] when patients were asked their willingness to undergo high-burden therapy for a chance to avoid death, 35% had an inconsistent preference trajectory, meaning that they were initially more and eventually less willing to undergo certain treatments, depending on their health status. The proportion with inconsistent trajectories increased to 48% and 49% when asked their willingness to risk physical or cognitive disability, respectively, to avoid death. Similarly, a descriptive study[43] found that community-dwelling elders' preferences for care are not consistent with documentation in their medical records. Another study examining patients' and surrogates' attitudes about using AD to manage EOL medical care revealed that very few individuals wished to document specific medical treatment preferences and to mandate that they be followed, without exception, near death.[44]

Another possible reason clinicians are challenged to document AD consistently has been attributed to lack of standardized location of the document in the EHR. A retrospective study[45] incorporating EpicCare EHR records to identify the locations of AD documentation showed that patients' age, sex, race, illnesses, and when their physician started at the medical group were statistically significantly associated with the probability of having a scanned AD document.

In addition, authors[46] who reviewed family involvement for intensive care unit patients found that family concerns about patients' preferences are less documented. Also, the authors pointed out that most deaths in the intensive care unit are often predictable and EOL management was a consultative process that should be incorporated with greater family involvement.

Practice Implications

The findings of this study have important implications for use of EHR incorporating CDS to enhance AD documentation that applies to nurses and patient care situations.[31] Well-designed CDS interfaces available to nurses at the point of care, which are displayed at appropriate times during clinical workflow, can influence care plan changes and trajectories related to AD decisions, which may yield better patient outcomes. Also, personal navigation style predicts whether nurses will make changes recommended within the CDS. It is also possible to increase the number of nurses who make recommended changes by designing an interface that steers users toward relevant CDS features regardless of their navigation styles.[31] Overall, the implication of this review to patient care is that absence of an electronic CDS that informs providers about patients' AD decisions may result in unnecessary interventions. Advance directive in paper charts may be difficult to access in emergency situations and may result in unnecessary and unwanted interventions and procedures. Documentation of AD in electronic records creates a readily accessible reference for care providers.[13]

LIMITATIONS

This study has limitations. First, limiting the selection of the studies to English only excludes several important studies in other languages that would have richly contributed to the review. A second limitation is that some studies conducted on CDS for patients' care may have been omitted because of the methodology and the types of search engines used for this review. However, incorporating review of ancestral literature may have helped researchers to collect data that were not included in search databases. The extraction and interpretation of the data in these particular studies might lead to possible content and context bias. To minimize this limitation, search terms that are theoretically related to the topic were carefully selected and several databases with extensive peer-reviewed health literature sources were searched to optimize the search strategy and increase quality of literature. Finally, the combination of different study designs including quantitative, qualitative, and mixed methods and sample sizes brings certain limitations when comparing studies in a literature review. To overcome this limitation, authors did bring a rigorous constant method of extraction, comparison, and synthesis of the literature, resulting in 2 tables with comparable data that enabled a response to specific aims. In addition, investigators incorporated rigorous methods to assess relevancy of studies to the proposed aims and research questions and to assess strength of design of the studies.

CONCLUSION

Advance directive documentation has been explored in many studies using different research methods, in different settings, and with different foci. A range of research exists in the literature, such as review of AD processes, examination of family involvement and patient surrogate attitudes about ADs, assessments and implementation of tools to improve AD documentation rates, development of electronic advance care planning, and assessment of both individual and environmental factors contributing to noncompliance with patients' care. Also, studies have been conducted on the assessment of code status documentation in the EHR and evaluation of CDS in nursing home. However, only very few studies have been conducted that are more specific to the use of CDS in the area of advance care planning, and no study was found that addressed the accessibility of ADs across different EHRs. More rigorous studies are needed in the area of implementation and evaluation of CDS for AD documentation process across different EHRs.

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