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The Impact of Social Determinants on Health Administration: A Comprehensive Review

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Abstract

Background: Social determinants of health (SDoH) significantly influence health outcomes and healthcare administration. Understanding and addressing these determinants is essential for improving patient care and reducing health disparities.

Methods: This comprehensive review analyzed existing literature on the integration of SDoH into electronic health records (EHRs) and their impact on health outcomes. A systematic search was conducted using databases such as PubMed, CINAHL, and EMBASE to identify studies that explored the relationship between SDoH and healthcare delivery. Key themes included data collection methodologies, predictive modeling, and intervention effectiveness.

Results: The review revealed that while EHRs increasingly incorporate SDoH data, significant gaps remain in capturing comprehensive information. Studies indicated that individual-level SDoH data improved predictive accuracy for healthcare outcomes, such as hospital readmissions and service referrals. Conversely, neighborhood-level data showed limited predictive value. The literature highlighted the importance of training healthcare providers, particularly nurses, to address SDoH effectively.

Conclusion: The integration of SDoH into EHRs is vital for enhancing nursing practice and improving population health outcomes. By prioritizing the collection and utilization of SDoH data, healthcare systems can better address the needs of diverse populations, ultimately leading to more effective interventions and improved health equity. Future research should focus on standardizing SDoH data collection methods and evaluating the impact of nursing interventions on health disparities.

Keywords: Social determinants of health, health administration, electronic health records, health equity, population health.

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1. Introduction

Social determinants of health (SDoH) refer to the conditions in which individuals are born, develop, reside, engage in work, and age [1]. They encompass the intricate, interrelated, and overlapping social structures and economic systems that contribute to the majority of health disparities. Healthy People 2020 categorize SDoH into five principal domains: (1) economic stability, (2) education, (3) health and health care, (4) neighborhood and built environment, and (5) social and community context. As population health gains prominence in health care delivery, SDoH are increasingly recognized as vital elements for identifying potential upstream factors leading to adverse outcomes and elevated costs [2-5]. Although often conflated with social risk factors—unfavorable social conditions that may lead to detrimental health outcomes—this review focuses on social and behavioral determinants that impact the entire population. Utilizing SDoH information, health systems, and professionals are expected to assess patient complexity, determine suitable interventions for diverse needs, and enhance care through integrated services and community collaborations to improve health outcomes, diminish health disparities, and reduce costs [6].

The digitization of clinical records offers an opportunity to incorporate Social Determinants of Health (SDoH) into electronic health records (EHRs) to improve care delivery and population health. The 2009 U.S. Health Information Technology for Economic and Clinical Health Act encouraged the nationwide adoption of EHRs [7,8]. Currently, almost all hospitals and around 90% of office-based doctors have implemented an Electronic Health Record (EHR) system. With the extensive deployment of EHRs, policy is now transitioning towards the meaningful use of EHR technology. The Medicare and Medicaid EHR Incentive Programs, currently referred to as the Promoting Interoperability Programs, established meaningful use requirements in three distinct stages with specific timelines [9]. Commencing in 2011, the first two phases focused on data acquisition (e.g., patients' medical histories, medicine prescriptions, vital signs, laboratory findings, radiological reports, physician and nursing documentation) and the enhancement of clinical processes, respectively [9]. The third stage, initiated in 2017, mandated that all hospitals and eligible healthcare professionals exhibit continuous quality improvement in care and eradicate healthcare disparities among all demographics. The incorporation of social determinants of health (SDoH) into electronic health record (EHR) systems is essential for healthcare organizations to fulfill Stage 3 requirements and avert reductions in Medicare reimbursements for noncompliance. Increasingly, healthcare institutions and practitioners are investigating methods to capture SDoH data within their EHRs and integrate SDoH-related referrals and interventions into standard care practices, aiming to evaluate their quality performance and manage the health of both individual patients and broader populations [10,11].

Electronic Health Records (EHRs) systematically gather clinical data on patients, including medical history, vital signs, laboratory tests and findings, and pharmaceutical prescriptions. Nonclinical health factors may be represented in structured data components, including age, race, ethnicity, and diagnostic codes (e.g., homelessness). Certain electronic health records (EHRs) incorporate specific lifestyle domains, including preferred languages, smoking, and alcohol consumption, in a structured format [12-14]. Additionally, information regarding selected environmental and social domains, such as housing, social support, and financial resource strain, may be obtained from the unstructured data within EHRs, such as free-text notes from physicians and nurses. However, EHR-derived social determinants of health (SDoH) data are inadequate to provide a comprehensive and accurate representation of SDoH domains, as numerous social

and behavioral determinants that could affect health and mortality remain unrecorded. The incorporation of Social Determinants of Health (SDoH) data into Electronic Health Records (EHRs) necessitates the determination of which SDoH data to gather, as well as the methodologies and timing for their collection. Furthermore, it is essential to assess the applicability of the collected SDoH data in risk prediction and intervention strategies aimed at enhancing outcomes, such as obtaining precise and comprehensive information regarding patients' living conditions and economic stability—two principal domains of SDoH—in forecasting the likelihood of 30-day hospital readmission [15,16].

Previous literature reviews have investigated the efficacy of interventions addressing social determinants of health (SDoH) or the evidence concerning SDoH screening in clinical settings; however, none have specifically analyzed the incorporation of SDoH into electronic health records (EHRs) for risk prediction and related analytics. Other systematic reviews have concentrated on particular domains of social determinants of health (SDoH), such as food insecurity, or on interventions aimed at enhancing SDoH for specific disadvantaged populations; alternatively, they have examined specific health outcomes, including type 2 diabetes, adolescent pregnancy, and adult all-cause mortality [17-20]. Significant findings from these systematic reviews highlight a scarcity of generalizable, high-quality evidence regarding the effects of SDoH interventions within the realm of population and public health. Golembiewski et al. conducted a rapid review, analogous to our work, focusing on U.S.-based articles published from January 2010 to April 2018, assessing the integration of nonclinical data from external sources with various clinical datasets. Due to the swift increase in the adoption of EHRs and the urgent requirements for their meaningful utilization to enhance health outcomes, it is crucial to comprehend the determinants, data sources, and metrics employed effectively in the novel context of prediction-assisted, EHR-enabled care delivery [21-24].

This study aims to examine and analyze existing literature to ascertain the impact of Social Determinants of Health (SDoH) on health outcomes via risk prediction and targeted intervention, as well as to identify the SDoH domains recorded in Electronic Health Records (EHRs). We seek to analyze quantitative evidence concerning the impact of social determinants of health (SDoH) on outcomes that significantly influence healthcare costs and quality, including disease diagnosis, healthcare service utilization, referrals, interventions aimed at SDoH, and the risk of emergency room visits and hospital admissions or readmissions. To assist in the development of national standards for the representation of SDoH information in EHRs, we also examine the sources and methodologies used in the studies to gather and evaluate domains pertinent to SDoH.

2. Materials and Methods

We searched PubMed, CINAHL, PsycINFO, EMBASE, and Web of Science. We deliberately formulated the search query to be as expansive as possible to ensure the extraction of a maximum number of results relevant to the research topics outlined in this systematic review.

3. General characteristics of the examined studies

The research on the integration of social determinants of health into electronic health records is relatively new but expanding rapidly. Integrated social determinants of health (SDoH) data from external sources into electronic health records (EHRs), with the American Community Survey (ACS) and U.S. data being the most often used external sources. Population survey [25-30]. Both the ACS and census data offer neighborhood-level social determinants of health (SDoH) information; however, the ACS delivers more current insights regarding the community's social and economic requirements at the census tract or ZIP code level every five years, along with annual estimates at the regional, state, and county levels [31-35]. Other studies that integrated SDoH into electronic health records (EHRs) utilized commercial databases such as Nielsen Prime Location and the Esri Business Analyst Premium product, or conducted their patient-level health surveys, as demonstrated by Wagaw et al. [36], or established community information systems, as seen in Comer et al. [37].

A majority of the literature investigated the relationship between social determinants of health (SDoH) and outcomes [38-41]. These studies differ in sample size (ranging from a few hundred to over 6 million

observations), geographic location (including over twelve nations), and the granularity of SDoH data (i.e., neighborhood-level ACS or census data, individual-level SDoH data derived from EHRs, or a combination of both). Nonetheless, they all affirmed that social determinants of health were, to some degree, correlated with outcomes. They discovered that enhanced social determinants of health (SDoH) measurements correlated with reduced illness incidence or improved health interventions, whereas social disadvantages were linked to screening, diagnosis, use of referral services, and negative health outcomes.

4. Determinants and risk factors of a social and behavioral nature

It is crucial to recognize that social (and behavioral) risk factors are sometimes confused with social (and behavioral) determinants in the rapidly advancing research. Although social determinants of health (SDoH) impact individuals positively or negatively, social risk factors refer to particular detrimental social situations (e.g., homelessness, socioeconomic deprivation) linked to poor health outcomes [42,43]. Moreover, social risk factors and behavioral risk factors (e.g., smoking, and insufficient exercise) are distinct but may be interconnected. Alderwick and Gottlieb [7] presented a relevant vocabulary of social determinants of health for healthcare systems. We examined the included articles to illustrate the use of various concepts in the literature, both as separate categories and in conjunction with one another. Sixty-eight percent of the research analyzed SDoH, whereas six percent investigated social risk factors. Of the remaining research (26%), 8% investigated both social and behavioral determinants of health, another 8% analyzed social determinants of health and behavioral risk factors, and 10% explored both social risk factors and behavioral risk factors. As healthcare activities and literature about the SDoH expand fast, enhanced knowledge of this conflation and precision regarding important words and their underlying ideas may result in more suitable use in future research and practices.

5. Incorporated the influence of Social Determinants of Health in forecasting

All but one study that integrated external neighborhood-level social determinants of health (SDoH) data into electronic health records (EHRs) demonstrated minimal enhancement to predictive performance across various models, including those predicting SDoH-related service referrals, repeat emergency department visits, hospitalizations, readmissions, and other healthcare service utilization [44]. The sole exception identified was that neighborhood poverty rate significantly predicted nonadherence to scheduled screening colonoscopy in multivariate analyses. Conversely, studies incorporating individual-level SDoH data consistently reported substantial improvements in performance regarding referrals to social workers, medication adherence, hospitalization risk, 30-day readmissions, HIV risk assessment predictions, and suicide attempts [45-50].

6. Challenges in the integration of Social Determinants of Health with Electronic Health Records

Electronic Health Records (EHRs) provide significant potential to consolidate, evaluate, and synthesize individual and community-level data across many contexts and temporal dimensions. Incorporating Social Determinants of Health (SDoH) into Electronic Health Records (EHRs) may provide a comprehensive view of factors influencing a patient's health state and facilitate the identification of both upstream and downstream strategies to enhance treatment efficacy. Research is increasingly focused on assessing the effects of community-level and individual-level social determinants of health integration in predictive modeling to enhance health outcomes and resource usage [51].

Data about community-level variables, including poverty, unemployment, and air pollution rates, is often accessible in a structured manner from the U.S. Analysis of current evidence indicates that community-level social determinants of health contribute little to predictive performance, with one exception in recent studies demonstrating a considerable influence of neighborhood poverty rates on colonoscopy screening [52].

Although individual-level social determinants of health data enhance predictive performance, they are more difficult to record properly. Various social or behavioral indicators have shown relevance in individual-level prediction studies, contingent upon the results seen in our review. Individual-level income,

housing, employment, and education have been identified as predictors of 30-day readmissions; housing stability, substance abuse, and high-risk sexual behaviors enhanced the predictive accuracy of HIV risk assessments; age, substance use, and mental disorders are significant factors in predicting suicide attempts; and self-perceived health status serves as a robust predictor of hospitalization. No standardized measurements can be proposed throughout these articles as a minimal set for collection and documentation in the HER [53,54]. Moreover, research has validated that the restricted array of Social Determinants of Health (SDoH) data recorded in Electronic Health Records (EHRs), such as race and ethnicity, is plagued by incomplete data and various quality concerns. Furthermore, individual-level determinants may fluctuate swiftly, especially when patients are effectively directed to suitable services. The substantial deficiencies in required electronic health information sharing might obstruct the efficient gathering and use of the always-evolving SDoH information [55].

The incorporation of SDoH information into EHRs is restricted to medical providers. It is crucial to involve patients in discussions regarding their social needs and promote self-reporting, enabling providers to align referrals with patient priorities and ensure accessibility. A significant difficulty is the absence of a unified standard for collecting or reflecting Social Determinants of Health (SDoH) in Electronic Health Records (EHRs). Patient data is compartmentalized across many systems and technological components of EHRs, necessitating innovative sharing methods to facilitate the efficient integration of SDoH data [56].

Ultimately, the integration of Social Determinants of Health (SDoH) into Electronic Health Records (EHR) for forecasting the risk of adverse events and pinpointing early intervention opportunities necessitates processes for downstream planning and tools for actionable decision-making by providers, especially when social risk factors are recognized within subpopulations, such as homelessness and food insecurity. Furthermore, workforce training, capacity planning, community resource identification, and streamlined allocation of these resources at the point of care, along with similar initiatives, are essential for the effective and efficient utilization of analytic insights [57].

7. Social Determinants of Health Inside Electronic Health Records

Federal, state, and municipal initiatives facilitate the incorporation of social determinants of health (SDoH) into electronic health records (EHRs), especially for individual-level factors. In 2014, the National Academy of Medicine advocated for the inclusion of 11 social and behavioral domains for data collection in electronic health records (EHRs). However, a consensus regarding which social determinants of health (SDoH) measures should be incorporated into EHRs remains elusive. Consequently, various patient-centric tools about SDoH have been developed, enabling patients to record their socioeconomic needs and thereby enhancing the validity and relevance of the social information gathered [58].

8. Increasing proof of influence

While the incorporation of community-based determinants has demonstrated minimal effectiveness in enhancing risk prediction performance, area-based social determinants of health (SDoH) can facilitate the monitoring of disparities. They can also aid in the creation of population-level indicators that characterize the health and quality of life within a geographic community, thereby offering a means to track and improve population health at regional or national scales. In contrast to research utilizing area-level SDoH data, recent investigations employing individual-level SDoH data have consistently shown markedly improved prediction performance, thereby expanding the evidence base with a substantial number of study participants [59].

Moreover, there is a lack of compelling evidence that social or behavioral risk factors may be adequately mitigated by referrals or other intervention mechanisms, in addition to the challenges associated with SDoH data gathering. More robust evidence is required to establish that data about social determinants of health may enhance the comprehension of population risk and refine predictive models. Robust evidence is required to establish that interventions aimed at certain social determinants of health areas, such as referrals to community services, would result in improved clinical outcomes by addressing patients' social needs. At present, the assessment criteria for referral programs mostly emphasize process measurements.

However, the majority of incentives in the context of value-based care are contingent upon enhancing clinical outcomes and minimizing costs. More thorough research with internal validity is necessary to evaluate both the care delivery process and results, therefore enhancing the understanding of intervention efficacy. There is a need for heightened awareness about the conflation of social (or behavioral) hazards with social (or behavioral) variables. This study recommends that researchers elucidate these essential terminologies and their underlying ideas in future studies to enhance policies and practices concerning SDoH [60-62].

This review has limitations. Initially, despite our extensive search across five major databases, we only presented results from published literature, thus overlooking unpublished research that may provide significant information. Secondly, due to the variability among the included research (e.g., differing circumstances and outcomes examined, diverse sources and degrees of SDoH data items analyzed, and study designs with or without treatments), it was infeasible to systematically implement a quality evaluation method for these investigations. Consequently, we included all studies because of their potential to enhance understanding of the influence of social determinants of health (SDoH).

9. Conclusion

This review elucidates the present state of literature about the incorporation of Social Determinants of Health (SDoH) into Electronic Health Records (EHRs), specifically focusing on the influence of this integration on the risk assessment objectives of research studies. Our results endorse the ongoing legislative initiatives aimed at establishing national standards for the representation of data concerning socioeconomic and behavioral determinants of health, as well as the development of technologies to integrate both community- and individual-level factors into electronic health records (EHRs). Incentivizing the gathering of SDoH data via financial or quality metrics is also crucial. Further study is essential to enhance the existing literature on the effects of social determinants of health interventions on healthcare outcomes, expenditures, and population health management, especially in clarifying the influence of social and behavioral risk factors.

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تأثير المحددات الاجتماعية على إدارة الصحة: مراجعة شاملة

الملخص

الخلفية: تؤثر المحددات الاجتماعية للصحة (SDoH) بشكل كبير على نتائج الصحة وإدارة الرعاية الصحية. يُعد فهم هذه المحددات ومعالجتها أمرًا أساسيًا لتحسين رعاية المرضى وتقليل التفاوتات الصحية.

الطرق: حللت هذه المراجعة الشاملة الأدبيات الحالية حول دمج المحددات الاجتماعية للصحة في السجلات الصحية الإلكترونية (EHRs) وتأثيرها على نتائج الصحة. تم إجراء بحث منهجي باستخدام قواعد بيانات مثل PubMed و CINAHLو EMBASEلتحديد الدراسات التي استكشفت العلاقة بين المحددات الاجتماعية وتسليم الرعاية الصحية. تضمنت المواضيع الرئيسية منهجيات جمع البيانات، النمذجة التنبؤية، وفعالية التدخلات.

النتائج: كشفت المراجعة أنه رغم تزايد دمج بيانات المحددات الاجتماعية للصحة في السجلات الصحية الإلكترونية، لا تزال هناك فجوات كبيرة في جمع معلومات شاملة. أشارت الدراسات إلى أن بيانات المحددات الاجتماعية على المستوى الفردي حسّنت الدقة التنبؤية لنتائج الرعاية الصحية، مثل إعادة دخول المستشفيات وإحالات الخدمات. في المقابل، أظهرت البيانات على مستوى الأحياء قيمة تنبؤية محدودة. وأبرزت الأدبيات أهمية تدريب مقدمي الرعاية الصحية، وخصوصًا الممرضين، على التعامل مع المحددات الاجتماعية للصحة بفعالية.

الخلاصة: يُعد دمج المحددات الاجتماعية للصحة في السجلات الصحية الإلكترونية أمرًا ضروريًا لتعزيز الممارسات التمريضية وتحسين نتائج صحة السكان. من خلال إعطاء الأولوية لجمع واستخدام بيانات المحددات الاجتماعية للصحة، يمكن لأنظمة الرعاية الصحية تلبية احتياجات السكان المتنوعين بشكل أفضل، مما يؤدي في النهاية إلى تدخلات أكثر فعالية وتحقيق مزيد من العدالة الصحية. ينبغي أن تركز الأبحاث المستقبلية على توحيد طرق جمع بيانات المحددات الاجتماعية وتقييم تأثير التدخلات التمريضية على التفاوتات الصحية.

الكلمات المفتاحية: المحددات الاجتماعية للصحة، إدارة الصحة، السجلات الصحية الإلكترونية، العدالة الصحية، صحة السكان.