Online Journal of Public Health Informatics

Contents

Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

Objective: To explore how disease-related causality is formally represented in current ontologies and identify their potential limitations. Methods: We conducted a systematic literature search on eight databases (PubMed, Institute of Electrical and Electronic Engendering (IEEE Xplore), Association for Computing Machinery (ACM), Scopus, Web of Science databases, Ontobee, Open Biological and Biomedical Ontology (OBO) Foundry, and Bioportal. We included studies published between January 1, 1970, and December 9, 2020, that formally represent the notions of causality and causation in the medical domain using ontology as a representational tool. Further inclusion criteria were publication in English and peer-reviewed journals or conference proceedings. Two authors (SS, RM) independently assessed study quality and performed content analysis using a modified validated extraction grid with pre-established categorization. Results: The search strategy led to a total of 8,501 potentially relevant papers, of which 50 met the inclusion criteria. Only 14 out of 50 (28%) specified the nature of causation, and only 7 (14%) included clear and non-circular natural language definitions. Although several theories of causality were mentioned, none of the articles offers a widely accepted conceptualization of how causation and causality can be formally represented. Conclusion: No current ontology captures the wealth of available concepts of causality. This provides an opportunity for the development of a formal ontology of causation/causality. (Abstract: 213 words)

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Abstract

Background: Accurate and timely information on health intervention coverage, quality, and equity is the foundation of public health practice. To achieve this, countries have made efforts to improve the quality and availability of community health data by implementing the community health information system that is used to collect data in the field generated by community health workers and other community-facing providers. Despite all the efforts, evidence on the current state is scant in Low Middle Income Countries (LMICs). Objective: To summarize the available evidence on the current implementation status, lessons learned and implementation challenges of community health information system (CHIS) in LMICs. Methods: We conducted a scoping review that included studies searched using electronic databases like Pubmed/Medline, World Health Organization (WHO) Library, Science Direct, Cochrane Library. We also searched Google and Google Scholar using different combinations of search strategies. Studies that applied any study design, data collection and analysis methods related to CHIS were included. The review included all studies published until February 30, 2022. Two authors extracted the data and resolved disagreements by discussion consulting a third author. Results: A total of 1,552 potentially relevant articles/reports were generated from the initial search, of which 21 were considered for the final review. The review found that CHIS is implemented in various structures using various tools across different LMICs. For the CHIS implementation majority used registers, family folder/card, mobile technologies and chalk/white board. Community level information was fragmented, incomplete and in most cases flowed only one way, with a bottom-up approach. The review also indicated that, technology particularly Electronic Community Health Information System (eCHIS) and mobile applications plays a role in strengthening CHIS implementation in most LMICs. Many challenges remain for effective implementation of CHIS with unintegrated systems including existence of parallel recording & reporting tools. Besides, lack of resources, low technical capacity, shortage of human resource and poor Information Communication Technology (ICT) infrastructure were reported as barriers for effective implementation of CHIS in LMICs. Conclusion: Generally, community health information system implementation in LMICs is in its early stage. There was not a universal or standard CHIS design and implementation modality across countries. There are also promising practices on digitalizing the community health information systems. Different organizational, technical, behavioural and economic barriers exist for effective implementation of CHIS. Hence, greater collaboration, coordination, and joint action are needed to address these challenges. Strong leadership, motivation, capacity building and regular feedback are also important to strengthen the CHIS in LMICs. Moreover, CHIS should be transformed in to eCHIS with integration of different technology solutions. Local ownership is also critical to the long-term sustainability of CHIS implementation.

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Abstract

Background: Due to the prevalence of the COVID-19 epidemic in all countries of the world, the need to apply health information technology is of great importance. Hence, the study has identified the role of health information technology during the period of COVID-19 epidemic. Methods: The present research is a review study by employing text-mining techniques. Therefore, 941 published documents related to health information technology"s role during COVID-19 epidemic were extracted by keyword searching in the Web of Science database. In order to analyze the data and implement the text mining and topic modeling algorithms, Python programming language was applied. Results: The results indicated that the highest number of publications related to the role of health information technology in the period of COVID-19 epidemic was respectively on the following topics: "Models and smart systems," "Telemedicine," "Health care," "Health information technology," "Evidence-based medicine," "Big data and statistic analysis." Conclusion: Health information technology has been extensively used during COVID-19 epidemic. Therefore, different communities could apply these technologies, considering the conditions and facilities to manage COVID-19 epidemic better.

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Abstract

Appending market segmentation data to a national healthcare knowledge, attitude and behavior survey and medical claims by geocode can provide valuable insight for providers, payers and public health entities to better understand populations at a hyperlocal level and develop cohort-specific strategies for health improvement. A prolonged use case investigates population factors, including social determinants of health, in depression and develops cohort-level management strategies, utilizing market segmentation and survey data. Survey response scores for each segment were normalized against the average national score and appended to claims data to identify at-risk segment whose scores were compared with three socio-demographically comparable but not at-risk segments via Nonparametric Mann-Whitney U test to identify specific risk factors for intervention. The marketing segment, New Melting Point (NMP), was identified as at-risk. The median scores of three comparable segments differed from NMP in "Inability to Pay For Basic Needs" (121% vs 123%), "Lack of Transportation" (112% vs 153%), "Utilities Threatened" (103% vs 239%), "Delay Visiting MD" (67% vs 181%), "Delay/Not Fill Prescription" (117% vs 182%), "Depressed: All/Most Time" (127% vs 150%), and "Internet: Virtual Visit" (55% vs 130%) (all with p<0.001). The appended dataset illustrates NMP as having many stressors (e.g., difficult social situations, delaying seeking medical care). Strategies to improve depression management in NMP could employ virtual visits, or pharmacy incentives. Insights gleaned from appending market segmentation and healthcare utilization survey data can fill in knowledge gaps from claims-based data and provide practical and actionable insights for use by providers, payers and public health entities.

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Abstract

Objective: The aims of the study were to examine the association between social media sentiments surrounding COVID-19 vaccination and the effects on vaccination rates in the United States (US), as well as other contributing factors to the COVID-19 vaccine hesitancy. Method: The dataset used in this study consists of vaccine-related English tweets collected in real-time from January 4 - May 11, 2021, posted within the US, as well as health literacy (HL), social vulnerability index (SVI), and vaccination rates at the state level. Results: The findings presented in this study demonstrate a significant correlation between the sentiments of the tweets and the vaccination rate in the US. The results also suggest a significant negative association between HL and SVI and that the state demographics correlate with both HL and SVI. Discussion: Social media activity provides insights into public opinion about vaccinations and helps determine the required public health interventions to increase the vaccination rate in the US. Conclusion: Health literacy, social vulnerability index and monitoring of social media sentiments need to be considered in public health interventions as part of vaccination campaigns. Keywords: COVID–19, Health Literacy, COVID–19 Vaccine Hesitancy, Social Vulnerability Index, Social Media, Social Determinants of Health Abbreviations: Health Literacy (HL), Social Vulnerability Index (SVI), Social Determinants of Health (SDOH), United States (US) Correspondence: gabriela.wilson@uta.edu

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Abstract

Objectives Health department personnel conduct daily active symptom monitoring for persons potentially exposed to SARS-CoV-2. This can be resource-intensive. Automation and digital tools can improve efficiency. We describe use of a digital tool, Sara Alert, for automated daily symptom monitoring across multiple public health jurisdictions. Methods Eleven of the 20 U.S. public health jurisdictions using Sara Alert provided average daily activity data during June 29 to August 30, 2021. Data elements included demographics, communication preferences, timeliness of symptom monitoring initiation, responsiveness to daily messages, and reports of symptoms. Results Participating jurisdictions served a U.S. population of over 22 million persons. Health department personnel used this digital tool to monitor more than 12,000 persons per day on average for COVID-19 symptoms. On average, monitoring began 3.9 days following last exposure and was conducted for an average of 5.7 days. Monitored persons were frequently < 18 years old (45%, 5,474/12,450) and preferred communication via text message (47%). Seventy-four percent of monitored persons responded to at least one daily automated symptom message. Conclusions In our geographically diverse sample, we found that use of an automated digital tool might improve public health capacity for daily symptom monitoring, allowing staff to focus their time on interventions for persons most at risk or in need of support. Future work should include identifying jurisdictional successes and challenges implementing digital tools; the effectiveness of digital tools in identifying symptomatic individuals, ensuring appropriate isolation, and testing to disrupt transmission; and impact on public health staff efficiency and program costs.

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Abstract

The pervasiveness of online mis/disinformation escalated during the COVID-19 pandemic. To address the proliferation of online mis/disinformation, it is critical to build reliability into the tools older adults use to seek health information. On average, older adult populations demonstrate disproportionate susceptibility to false messages spread under the guise of accuracy and were the most engaged with false information about COVID-19 across online platforms when compared to other age-groups. In a design-thinking challenge posed by AARP to graduate students in a Digital Health course at Tufts University School of Medicine, students leveraged existing solutions to design a web browser extension that is responsive to both passive and active health information-seeking methods utilized by older adults in the United States. This paper details the design-thinking process employed, insights gained from primary research, an overview of the prototyped solution, and insights relating to the design of effective health information-seeking platforms for older adults.

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Objective: There is a low rate of online patient portal utilization in the U.S. This study aimed to utilize a machine learning approach to predict access to online medical records through a patient portal. Methods: This is a cross-sectional predictive machine learning algorithm-based study of Health Information National Trends datasets (Cycles 1 and 2; 2017-2018 samples). Survey respondents were U.S. adults (≥18 years old). The primary outcome was a binary variable indicating that the patient had or had not accessed online medical records in the previous 12 months. We analyzed a subset of independent variables using k-means clustering with replicate samples. A cross-validated random forest-based algorithm was utilized to select features for a Cycle 1 split training sample. A logistic regression and an evolved decision tree were trained on the rest of the Cycle 1 training sample. The Cycle 1 test sample and Cycle 2 data were used to benchmark algorithm performance. Results: Lack of access to online systems was less of a barrier to online medical records in 2018 (14%) compared to 2017 (26%). Patients accessed medical records to refill medicines and message primary care providers more frequently in 2018 (45%) than in 2017 (25%). Discussion: Privacy concerns, portal knowledge, and conversations between primary care providers and patients predict portal access. Conclusion: Methods described here may be employed to personalize methods of patient engagement during new patient registration.

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