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Contents

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

Abstract

This commentary explores the potential and challenges of developing syndromic surveillance systems with the ability to more rapidly detect epidemics of addiction, poverty, housing instability, food insecurity, social isolation and other social determinants of health (SDoH). Epidemiologists tracking SDoH heavily rely on expensive government surveys released annually, delaying the timely detection of spikes in social epidemics for months if not years. Conversely, infectious disease syndromic surveillance is an effective early warning tool for epidemic diseases using various types of non-traditional epidemiological data from emergency room chief complaints to search query data. Based on such experience, novel social syndromic surveillance systems for early detection of social epidemics with health implications are not only possible but necessary. Challenges to their widespread implementation include incorporating disparate proprietary data sources and database integration. Significantly more resources are critically needed to address these barriers to allow for accessing, integrating and rapidly analyzing appropriate data streams to make syndromic surveillance for social determinants of health widely available to public health professionals.

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

Abstract

Subjective well-being (SWB) is an individual's judgment about their overall well-being. Research has shown that activities that elevate people's sense of SWB have a significant effect on their overall health. There are two dimensions of SWB: Affective and Cognitive dimensions. However, studies on SWB usually focus more on one dimension, ignoring the other dimension. Also, most existing studies on SWB focused on individuals from Western cultures. Research has shown that the influence of personality on the subjective well-being components is moderated by culture. Thus, to advance research in personalizing persuasive health interventions, this study focuses on Africans (n=732). Specifically, we investigate the relationship between the Big-Five personality traits and both dimensions of SWB using the constructs: Happiness, Satisfaction with Life, Social, Psychological and Emotional well-being. Our results reveal that to design PTs to promote SWB for people high in Agreeableness, designers should focus on designing to promote their feeling of Happiness and Social Well-being, while for Neuroticism, designers should focus on designing to promote Psychological well-being and Emotional well-being. Based on our findings, we offer guidelines for tailoring persuasive health interventions to promote individuals' SWB based on their personality.

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

Abstract

Diabetes is a salient issue and a significant health care concern for many nations. The forecast for the prevalence of diabetes is on the rise. Hence, building a prediction machine learning model to assist in the identification of diabetic patients is of great interest. This study aims to create a machine learning model that is capable of predicting diabetes with high performance. The following study used the BigML platform to train four machine learning algorithms, namely, Deepnet, Models (decision tree), Ensemble and Logistic Regression, on data sets collected from the Ministry of National Guard Hospital Affairs (MNGHA) in Saudi Arabia between the years of 2013 and 2015. The comparative evaluation criteria for the four algorithms examined included; Accuracy, Precision, Recall, F-measure and PhiCoefficient. Results show that the Deepnet algorithm achieved higher performance compared to other machine learning algorithms based on various evaluation matrices.

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

Abstract

Objective: To support the End TB strategy with an informatics system that integrates genomic data and the geographic information system (GIS) of Mycobacterium tuberculosis (MTB) clinical isolates. The priority of the information system is to control multiple drug-resistant tuberculosis (MDR-TB). Methods: System requirements were clarified using an exploratory approach. A data value chain was applied for system prototyping. Role-based access control was adopted for system permission management. MDR-TB isolates were collected from Kanchanburi Province, Thailand, from 2013–2017. Genotyping information of the isolated MDR-TB strains was obtained from whole genome sequencing analysis. Spatiotemporal analysis using SaTScan™ version 9.6 was performed to identify significant high rate spatial MDR-TB clusters or hotspots of MDR-TB transmission. Results: The iMoji system architecture was established. The data entry modules consisted of (1) patient registration, (2) sample registration, (3) laboratory data entry and data analysis, and (4) verification and approval of the analyzed data. An integrative analysis of the MDR-TB genotype and geospatial data provided information for the MDR-TB cluster analysis. An MDR-TB transmission hotspot was identified with the log-likelihood ratio of 14.44 (P value < 0.001). Temporal analysis suggested that transmission occurred more frequently between 12/1/2014 to 2/28/2017. Conclusion: Our findings provide a proof of concept for integrating genomic data from MDR-TB and corresponding spatiotemporal information to guide public health interventions for tuberculosis control.

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

Abstract

Objective: ASHA-Soft is the pioneer e-Health program which was launched to manage online payment and for monitoring performance of ASHA workers in Rajasthan. There is a paucity of studies which documents the feasibility and effectiveness of this program with aim to assess the feasibility and effectiveness of ASHA-Soft program. Methods: Study was conducted in Jodhpur using quantitative and qualitative method. Primary and secondary data approach was used to assess feasibility and effectiveness of ASHA-Soft. Purposive sampling was done to recruit 150 ASHA workers having experience of more than 5 years to capture the perception before and after implementation of ASHA-Soft. Qualitative data was also obtained from ASHA workers and key stakeholders. To assess the effectiveness secondary data was obtained from various sources was analyzed. Results: Mean age of participants were 35.51 + 6.7 years. Most of ASHAs agreed that ASHA-Soft mediated timely payment (68%) and payment according to their performance (81%). It also increased their motivational level (96%).There were no significant difference in different work experience of ASHAs and perception towards ASHA-Soft regarding timely payment (p=0.99), improving quality of life (p=0.66) and motivation level (p=0.40). This program has provided standard online procedure of online payment and monitoring for ASHAs. Incentives received by ASHAs increased to 77%, performance increased by 7% and 9% for maternal health and child health respectively within one year of its initial implementation. Conclusions: Study finding demonstrate that ASHA-Soft program is acceptable to the users and is effective in terms of meeting organizational requirement.

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

Abstract

This concept article introduces a transformative vision to reduce the population burden of chronic disease by focusing on data integration, analytics, implementation and community engagement. Known as PHOENIX (The Population Health OutcomEs aNd Information EXchange), the approach leverages a state level health information exchange and multiple other resources to facilitate the integration of clinical and social determinants of health data with a goal of achieving true population health monitoring and management. After reviewing historical context, we describe how multilevel and multimodal data can be used to facilitate core public health services, before discussing the controversies and challenges that lie ahead.

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

Abstract

Background: Public Health Informatics (PHI) has taken on new importance in recent years as health and well-being face a number of challenges, including environmental disasters, emerging infectious diseases, such as Zika, Ebola and SARS-CoV-2, the growing impact of the Influenza virus, the opioid epidemic, and social determinants of health. Understanding the relationship between climate change and the health of populations adds further complexity to global health issues. Objectives: To describe four examples of curricula that exist in U.S. based graduate-level public and population health informatics training programs. Methods: Biomedical informatics educators are challenged to provide learners with relevant, interesting, and meaningful educational experiences in working with and learning from the many data sources that comprise the domain of PHI. Programs at four institutions were reviewed to examine common teaching practices that stimulate learners to explore the field of public health informatics. Results: Four case studies represent a range of pedagogical approaches to meeting the requirements of three established accreditation/certification agencies relevant to PHI education. Despite their differences, each program achieved the established learning objectives along with a substantive record of student learning achievements. Conclusion: The overarching goal of empowering learners to serve an active and dynamic role in enhancing preventive measures, informing policy, improving personal health behaviors, and clarifying issues such as quality, cost of care, and the social determinants of health, are essential components of PHI education and training, and must receive additional consideration now and in the future by educators, policy makers, administrators, and government officials.

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

Abstract

Background: Reducing maternal and infant mortality rates remains challenging. Illiteracy, lack of reliable information, long distances to health centers continue to limit access to quality maternal healthcare in Uganda. Mobile health technologies could be promising affordable strategies for enhancing access to maternal health services. However, there is lack of studies assessing the experiences of illiterate rural pregnant women regarding these technologies. Objective: To explore how illiterate pregnant women perceive a maternal health mobile application composed of tailored video and audio messages, appointment reminders and calling function. Methods: We purposively sampled illiterate pregnant women initiating antenatal care at Mbarara Regional Referral Hospital. We carried out three focus group discussions with 14 women to elicit information on perceptions of the proposed mobile phone based multimedia application. We used STATA 13 to describe study participants and their preferences. Results: Pregnant women anticipated that intervention would enhance maternal health by reminding them to attend antenatal appointments, enabling transport cost and time saving, providing tailored information that is easy to understand, and recall. However, financial constraints and phone sharing would limit the functionality. Conclusion: Mhealth application may provide acceptable and affordable alternative approaches to providing maternal health services, especially in settings where face-to-face approaches are challenging.

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

Abstract

Background During the 2009 H1N1 influenza pandemic (pH1N1), the proportion of outpatient visits to emergency departments, clinics and hospitals became elevated especially during the early months of the pandemic due to surges in sick, ‘worried well’ or returning patients seeking care. We determined the prevalence of return visits to a multispecialty clinic during the 2009 H1N1 influenza pandemic and identify subgroups at risk for return visits using model-based recursive partitioning. Methods This was a retrospective analysis of ILI-related medical care visits to multispecialty clinic in Houston, Texas obtained as part of the Houston Health Department Influenza Sentinel Surveillance Project (ISSP) during the 2009 H1N1 pandemic influenza (April 2009 – April 2010). The data comprised of 2680 individuals who made a total of 2960 clinic visits. Return visit was defined as any visit following the index visit after the wash-out phase prior to the study period. We applied nominal logistic regression and recursive partition models to determine the independent predictors and the response probabilities of return visits. The sensitivity and specificity of the outcomes probabilities was determined using receiver operating characteristic (ROC) curve. Results Overall, 4.56% (Prob. 0.0%-17.5%) of the cohort had return visits with significant variations observed attributed to age group (76.0%) and type of vaccine received by patients (18.4%) and Influenza A (pH1N1) test result (5.6%). Patients in age group 0-4 years were 9 times (aOR: 8.77, 95%CI: 3.39-29.95, p<0.0001) more likely than those who were 50+ years to have return visits. Similarly, patients who received either seasonal flu (aOR: 1.59, 95% CI 1.01-2.50, p=0.047) or pH1N1 (aOR: 1.74, 95%CI: 1.09-2.75, p=0.022) vaccines were about twice more likely to have return visits compared to those with no vaccination history. Model-based recursive partitioning yielded 19 splits with patients in subgroup I (patients of age group 0-4 years, who tested positive for pH1N1, and received both seasonal flu and pH1N1 vaccines) having the highest risk of return visits (Prob.=17.5%). The area under the curve (AUC) for both return and non-return visits was 72.9%, indicating a fairly accurate classification of the two groups. Conclusions Return visits in our cohort was more prevalent among children and young adults and those that received either seasonal flu or pH1N1 or both vaccines. Understanding the dynamics in care-seeking behavior during pandemic would assist policymakers with appropriate resource allocation, and in the design of initiatives aimed at mitigating surges and recurrent utilization of the healthcare system. Keywords: Model-based recursive partitioning, subgroup analysis, Influenza-like-illness, H1N1, influenza pandemic, care-seeking behavior, return visit

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

Abstract

Human activity encompasses a series of complex spatiotemporal processes that are difficult to model but represent an essential component of human exposure assessment. A significant empirical data source, like the American Time Use Survey (ATUS), can be leveraged to model human activity. However, tractable models require a better stratification of activity data to inform about different, but classifiable groups of individuals, that exhibit similar activity sequences and mobility patterns. Using machine learning algorithms, we developed an unsupervised classification and sequence generation method that is capable of generating coherent and stochastic sequences of activity from the ATUS data. This classification, when combined with any spatiotemporal exposure profile, allows the development of stochastic models of exposure patterns and records for groups of individuals exhibiting similar activity behaviors.

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

Abstract

Social media allows for the exploration of online discussions of health issues outside of traditional health spaces. Twitter is one of the largest social media platforms that allows users to post short comments (i.e., tweets). The unrestricted access to opinions and a large user base makes Twitter a major source for collection and quick dissemination of some health information. Health organizations, individuals, news organizations, businesses, and a host of other entities discuss health issues on Twitter. However, the enormous number of tweets presents challenges to those who seek to improve their knowledge of health issues. For instance, it is difficult to understand the overall sentiment on a health issue or the central message of the discourse. For Twitter to be an effective tool for health promotion, stakeholders need to be able to understand, analyze, and appraise health information and discussions on this platform. The purpose of this paper is to examine how a visual analytic study can provide insight into a variety of health issues on Twitter. Visual analytics enhances the understanding of data by combining computational models with interactive visualizations. Our study demonstrates how machine learning techniques and visualizations can be used to analyze and understand discussions of health issues on Twitter. In this paper, we report on the process of data collection, analysis of data, and representation of results. We present our findings and discuss the implications of this work to support the use of Twitter for health promotion.

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

Abstract

Context: In the United States, immunization recommendations and their associated schedules are developed by the Advisory Committee on Immunization Practices (ACIP). To assist with the translation process and better harmonize the outcomes of existing clinical decision support tools, the Centers for Disease Control and Prevention (CDC) created clinical decision support for immunization (CDSi) resources for each set of ACIP recommendations. These resources are continually updated and refined as new vaccine recommendations and clarifications become available and will be available to health information systems for a coronavirus disease 2019 (COVID-19) vaccine when one becomes available for use in the United States. Objectives: To assess awareness of CDSi resources, whether CDSi resources were being used by immunization-related health information systems, and perceived impact of CDSi resources on stakeholders' work. Design: Online surveys conducted from 2015–2019 including qualitative and quantitative questions. Participants: The main and technical contact from each of the 64 CDC-funded immunization information system (IIS) awardees, IIS vendors, and electronic health record vendors. Results: Awareness of at least one resource increased from 75% of respondents in 2015 to 100% in 2019. Use of at least one CDSi resource also increased from 47% in 2015 to 78% in 2019. About 80% or more of users of CDSi are somewhat or very highly satisfied with the resources and report a somewhat or very positive impact from using them. Conclusion: As awareness and use of CDSi resources increases, the likelihood that patients receive recommended immunizations at the right time will also increase. Rapid and precise integration of vaccine recommendations into health information systems will be particularly important when a COVID-19 vaccine becomes available to help facilitate vaccine implementation.

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